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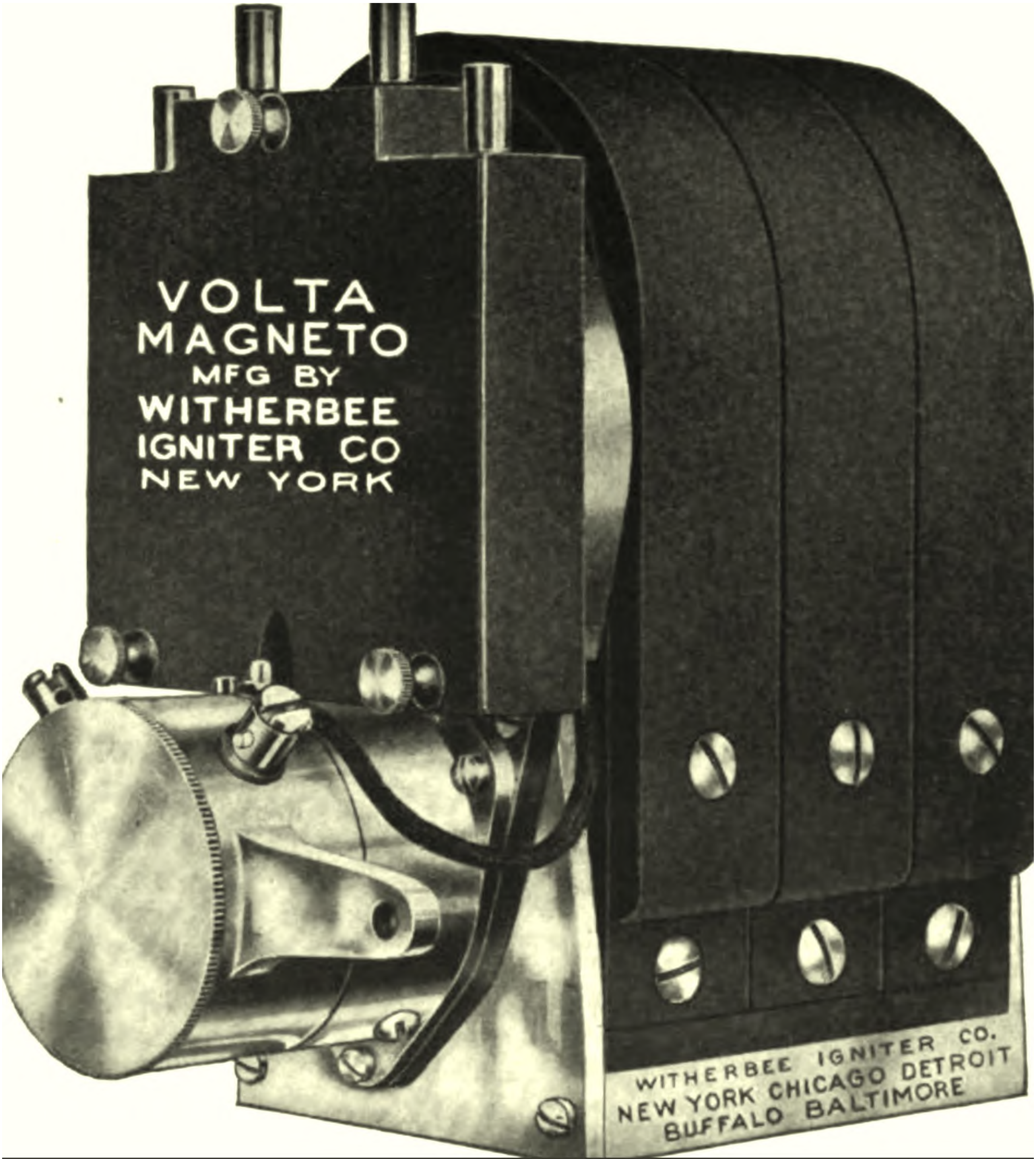
VOLTA
MAGNETO
MFG BY
WITHERBEE
IGNITER CO
NEW YORK
WITHERBEE IGNITER CO.
NEW YORK CHICAGO DETROIT
BUFFALO BALTIMORE

# Automobile trade journal

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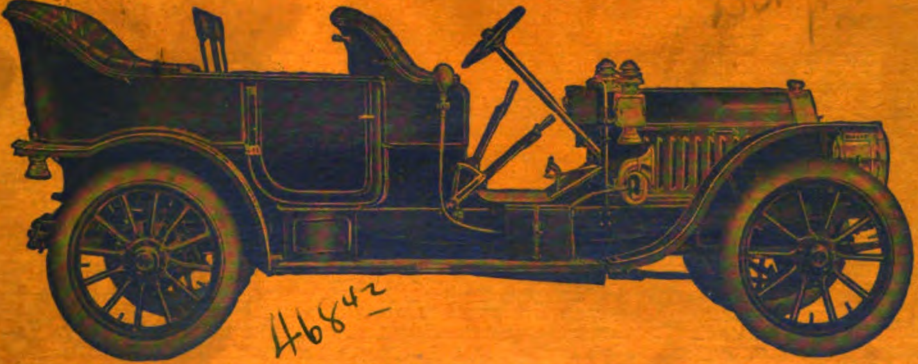
Price, 20c.

Vol. XIII, No. 7 PHILADELPHIA JANUARY 1, 1909

# CYCLE AND AUTOMOBILE TRADE JOURNAL

*Peerless*

Voelkner + Rein
[illegible]



46842

## 1909 PEERLESS CARS

MODEL 19 : Four Cylinder Thirty Horse-Power Touring Car : Price, $4,300
MODEL 25 : Six Cylinder Fifty Horse-Power Touring Car : Price, $6,000

PEERLESS cars will be manufactured in two models during the 1909 season. These cars are similar to the corresponding 1908 models. The improvements and slight changes may be regarded as the expected results of experience combined with a constant effort to keep the Peerless ahead of its class.

The high state of perfection reached represents the steady progress of many years and demonstrates that each new model, though improved and better, is not revolutionary in type nor essentially different from its predecessors.

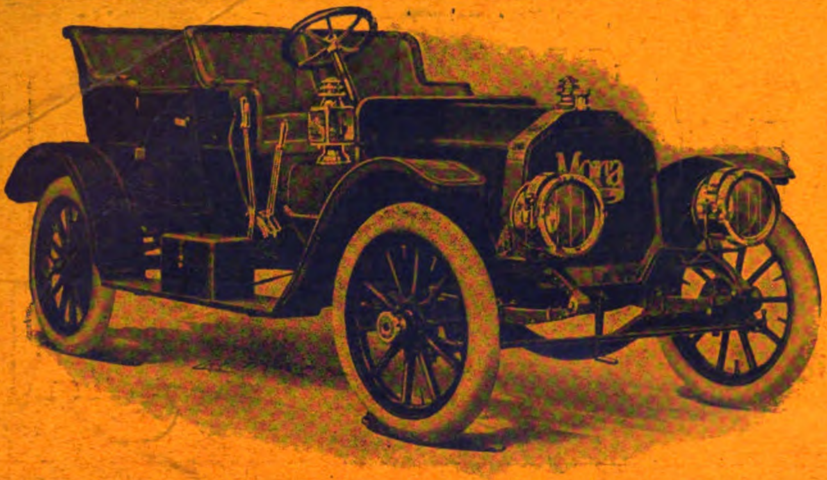
The new models are now offered for early fall delivery.

*Write for new Booklet F describing the new features on the 1909 Models*

**The Peerless Motor Car Company** 2459 EAST NINETY-THIRD ST.
CLEVELAND OHIO

CHILTON PRINTING COMPANY, MARKET AND 49TH STREETS, PHILADELPHIA

GENERAL INDEX, PAGE 127



# LIGHT FOUR ROADSTER, 1909—$1850

# Get a Mora

MECHANICALLY RIGHT

Mr. Owner:—

When Summer comes again, Mr. Owner, there will be 500 more Mechanically Right motor cars on the road. There will be 500 more enthusiastic boosters for the agent who sold and manufacturer who made the Mechanically Right Mora. The first car we sold is running and giving its owner satisfaction to-day. We have made many improvements since that time but the standard for strenuous reliability set by this first model was so high that it commands as high a price in proportion to original selling price in the second-hand market in New York as any automobile ever built, and a higher price than most others.

Now, Mr. Owner, it may not seem at first sight that you are interested in the second-hand value of the car which you own, but just a moment if you please—is it not a fact that the most serious condition to be met is the question—what can I get for my car in trade? Is it not also a fact that more liberal allowance is made on the car which is seldom found offered second-hand, because of the buyer who limits his investment looking for a second-hand, high-grade, rather than a new, cheap car? Here is the way it works, you buy a Mechanically Right Mora, find it capable of strenuous performance with minimum repairs, become enthusiastic, and next year want a new model. You approach your dealer who cheerfully agrees to trade and offers a liberal allowance because he knows the used car will sell readily at a good price to the man who wishes to limit his investment, but appreciates that a second-hand Mechanically Right Mora is better than a cheap, new car. Think it over, Mr. Owner; it's worth your while and we are glad to hear from you even if you don't buy.

## MORA MOTOR CAR COMPANY

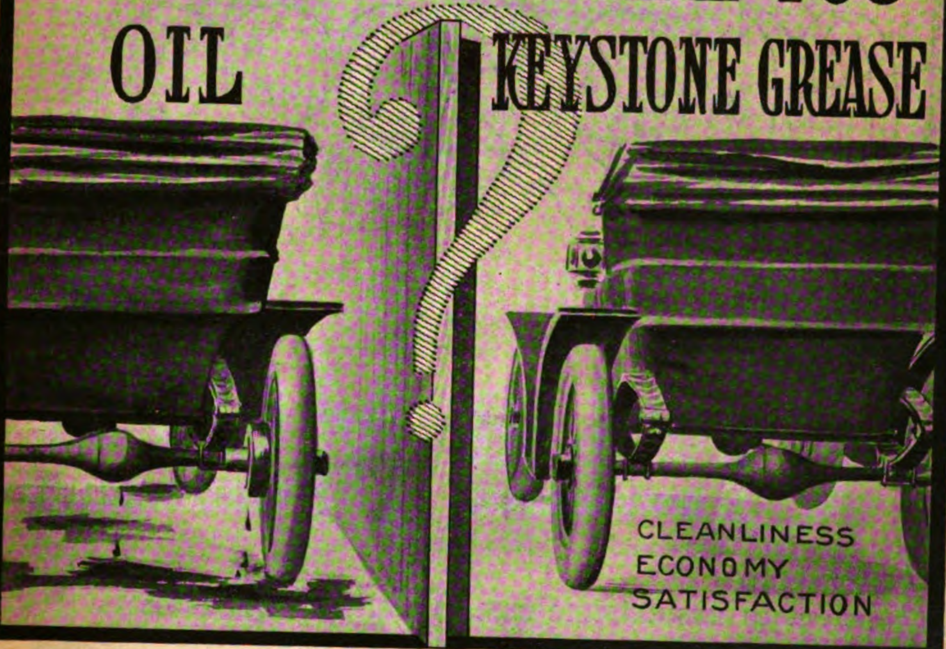
(Members A. M. C. M. A.)

Mora Roadster
TRADE MARK

**17 Mora Place, Newark, New York**

**New York Branch: Broadway and 52d Street**
**Chicago Agents: 1329 Michigan Avenue**

# ON WHICH SIDE OF THE FENCE ARE YOU



# KEYSTONE GREASE

is the most satisfactory automobile lubricant you can use. It is much more cleanly than oil and does not leave indications of wasteful extravagance, wherever the automobile stops. It works equally well in hot or cold, damp or dry weather. It is a mineral preparation and therefore free from animal acids which injure the metal. It is the grease for the dealer to sell, because it gives universal satisfaction. It is the grease for the motorist to buy because it protects him against lubrication troubles. Write for full details regarding *Keystone Grease.*

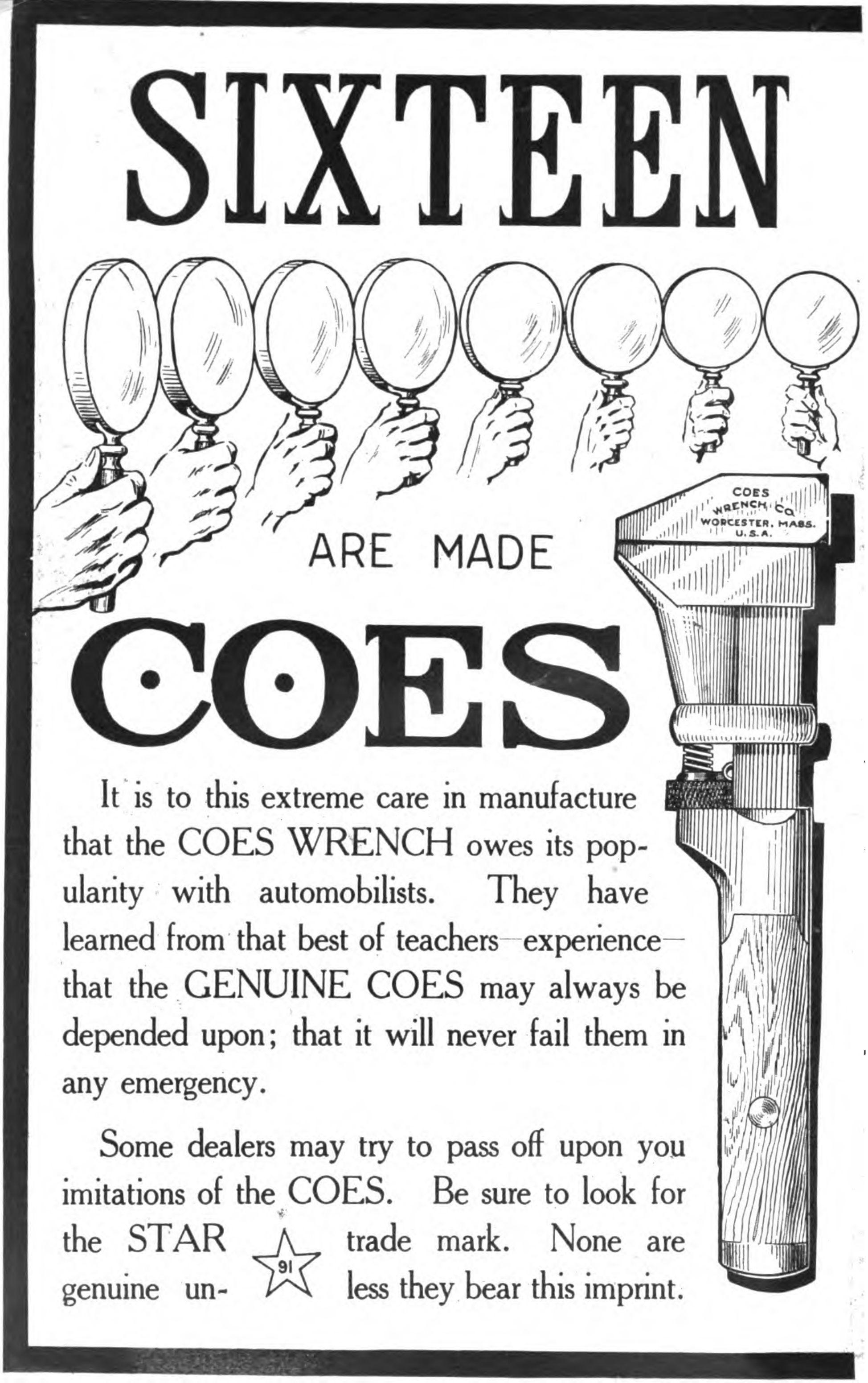
**KEYSTONE LUBRICATING CO.,** **EXECUTIVE OFFICES and WORKS**
**PHILADELPHIA, PENNSYLVANIA**

BRANCH OFFICES AND WAREHOUSES

10 Oliver Street, Boston, Mass.
610 and 612 Chartres Street, New Orleans, La.
96 Warren Street, New York

1210 Tacoma Building, Chicago, Ill.
502 McPhee Building, Denver, Col.
268 Market Street, San Francisco, Cal.

**WE HAVE NO CONNECTION WITH THE OIL TRUST**


COES WRENCH CO. WORCESTER, MASS. U.S.A.
91

SIXTEEN

ARE MADE

COES

It is to this extreme care in manufacture that the COES WRENCH owes its popularity with automobilists. They have learned from that best of teachers—experience—that the GENUINE COES may always be depended upon; that it will never fail them in any emergency.

Some dealers may try to pass off upon you imitations of the COES. Be sure to look for the STAR trade mark. None are genuine unless they bear this imprint.

# INSPECTIONS

BEFORE WE FINALLY PASS A

# WRENCH

COES WRENCHES are made in five styles and 50 sizes, and are 30 per cent. stronger than any other wrench. The GENUINE COES is fully guaranteed.

## Coes Wrench Company

WORCESTER, MASSACHUSETTS

*New York Agents*

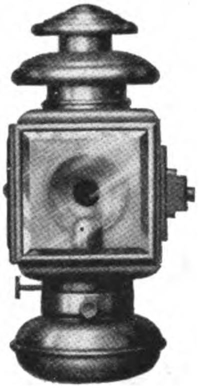
J. C. McCARTY & CO., 21 Murray Street, New York City
J. H. GRAHAM & CO., 113 Chambers Street, New York City

# SOLAR LAMPS

## *Exclusive Features of Solar Lamps*

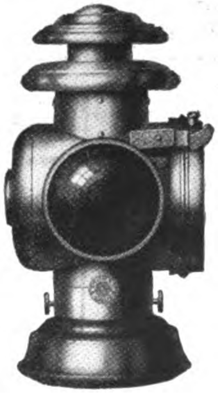
**All Solar Headlights are assembled by INTERIOR screws, resulting in PERFECTLY SMOOTH exterior surface.**

**Special Short Focus Mangin Mirror Reflectors of the highest Quality and proven efficiency—made by Bausch & Lomb exclusively for Solar Lamps**



**Square Oil Side Lamp, 833**
**Per pair . . . . . . $13.00**

**Taxicab Square Side Lamp, 932**
**Per pair . . . . . . . . . $11.00**



**Junior Oil Tail Lamp, 805**
**Each . . . . . . . $3.50**

**Solar Gas Generator, 811**
**Each . . . . . . . . . $9.00**

## Badger Brass Manufacturing Company

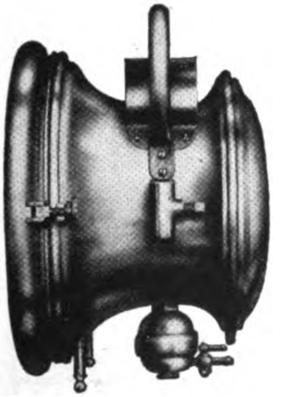
# SHOW THE WAY

## *Exclusive Features of Solar Lamps*

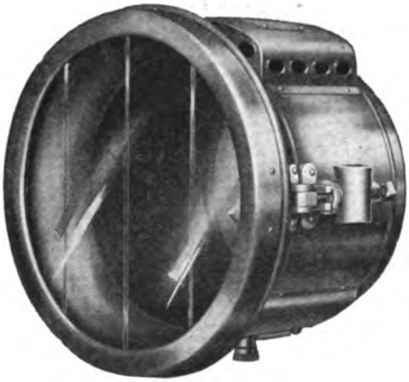
**An EXCLUSIVE Black Finish with a metallic lustre, absolutely impervious to heat and moisture. It eliminates the care and trouble of keeping brass lamps bright.**

## Solar Gas Generators

**are unquestionably the most reliable generators made. They embody the ONLY CORRECT PRINCIPLE of gas generation (wick feed) making flooding impossible. They are made round so as to enable each part to be DRAWN FROM ONE PIECE OF HEAVY SHEET BRASS (not from pieces soldered together). This method absolutely removes the possibility of leakage and produces a steady supply of never-failing gas.**



**Solar Lens Mirror Projector**
**7-inch Lens Mirror**
**Each, $17.50**



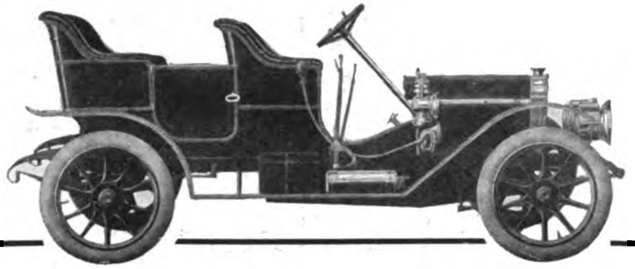
**Solar Lens Mirror Headlight, 956 A**
**6-inch Lens Mirror**
**Each, $8.00**

***Write for Complete Catalog showing all 1909 Models***

**Kenosha, Wis., and New York City**

# SEE THEM AT THE

# SHOWS

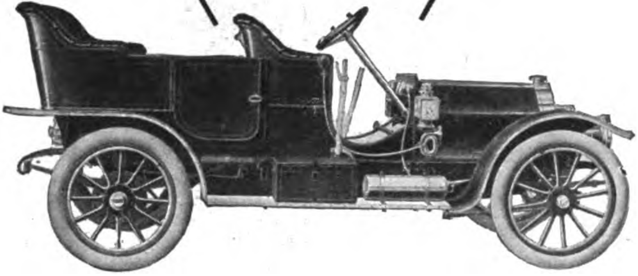


# KISSEL KAR—

**ALL QUALITY**

**At the Top**
**MODEL L. D. 9**
**4 cylinder, 30 H. P**
**Roadster - - $1350**
**Touring Car - - $1500**

**At the Bottom**
**MODEL D. 9**
**4 cylinder, 40 H. P.**
**Touring Car and Roadster - - $2000**



Earnestly investigate and compare the Kissel Kar with any of the higher priced cars—you won't find a reason for paying as much as three thousand dollars for a car, unless, perhaps you want an extra powerful, luxurious touring car like Model G, the 6 cylinder, 60 H. P. Kissel Kar selling for that.

Kissel Kars are identical mechanically with cars selling from $3000 up. Selective type transmission, Timken roller bearings, floating type rear axle, I beam front axle, ¾ elliptic springs, quick detachable tires, Atwater-Kent generator or **Remy magneto with single unit coil and dry cells on Model D. 9 and G. 9, Remy magneto with single unit coil and dry cells on Model L. D. 9.**

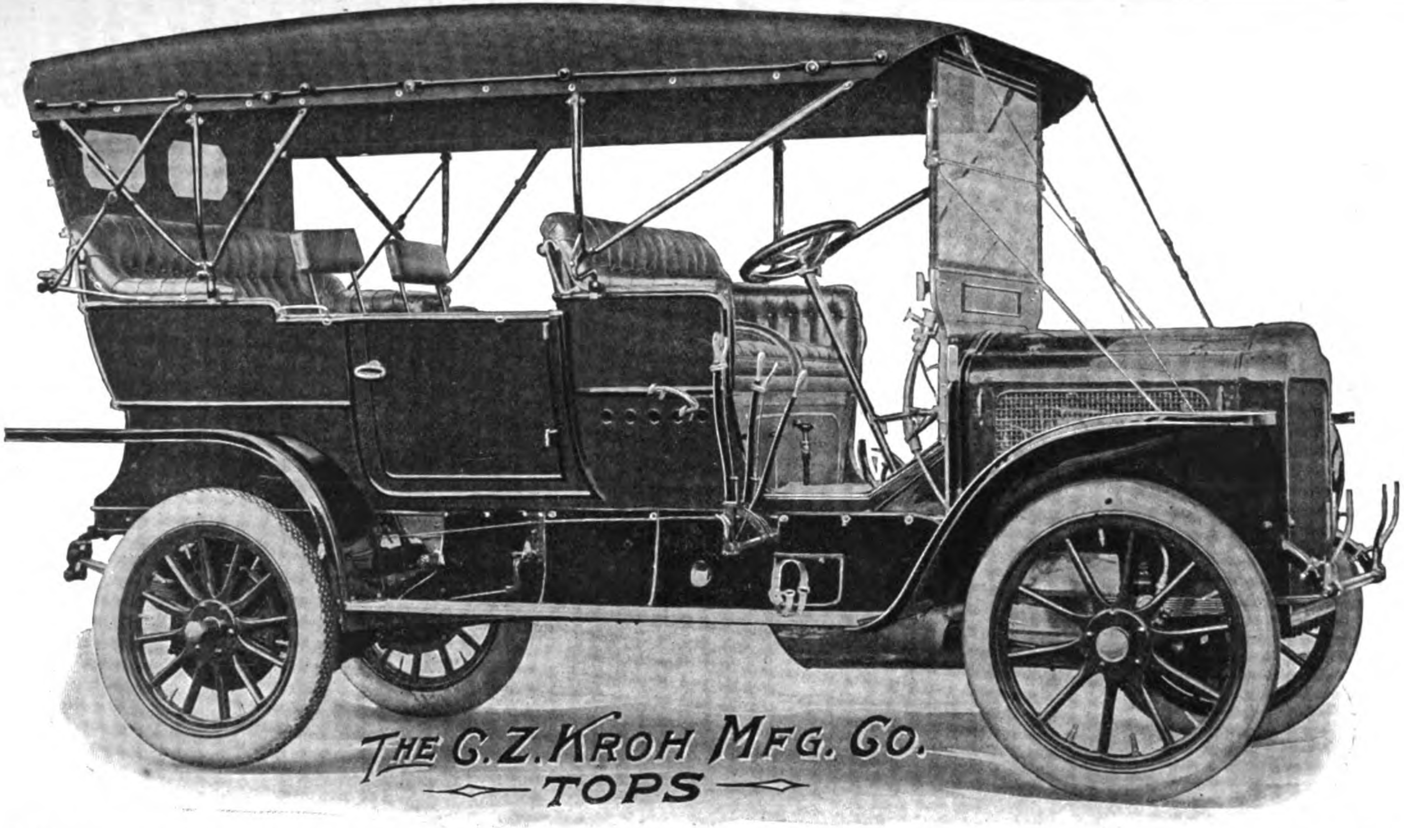
**Remy Magneto with Single Unit Coil**

*Write To-day for Catalog*

**And remember to see the Kissel Kar at the shows**

**Atwater-Kent Generator**

**KISSEL MOTOR CAR CO., 120 Kissel Ave., Hartford, Wis.**



THE C. Z. KROH MFG. CO.
TOPS

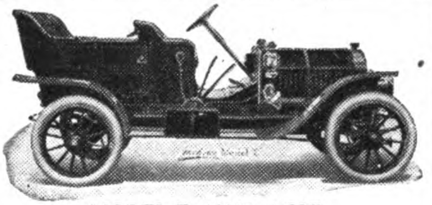
**THE C. Z. KROH MANUFACTURING CO.,** **Toledo, Ohio**

Manufacturers of high-grade, tailor-made Automobile Tops

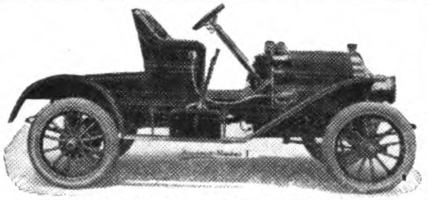
Send for our 1909 Illustrated Catalogue—Just out

Jackson
AUTOMOBILES

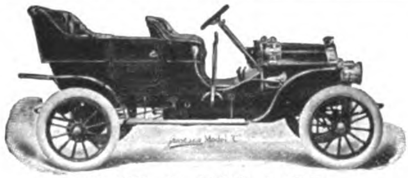
SEASON
OF 1909



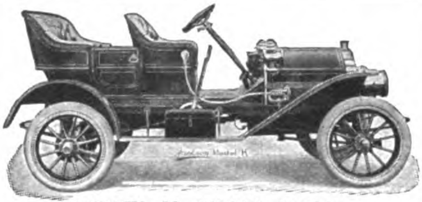
MODEL E, $2000, 4 CYL.



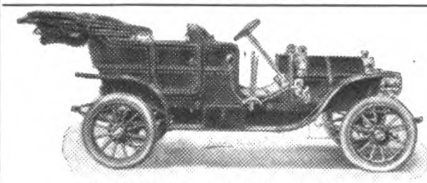
MODEL H, $1600, 4 CYL.



MODEL C, $1250, 2 CYL.



MODEL K, $950.00, 2 CYL.



MODEL F, $850.00, 2 CYL.

# Dealers:

**If you want a clean-cut, up-to-date, snappy, reliable line of cars---a complete line---a dependable line it is pleasant and profitable to sell---get the JACKSON agency!**

**1909 Models will be exhibited and demonstrated at the Grand Central Palace Show, New York, Dec. 31—Jan. 6, and at the Coliseum Show, Chicago, Feb. 6—13.**

**There are especially good features to be found in Jackson cars which give them individuality. Every point is made a substantial point. Every unnecessary frill is cut out. Every possible provision is made for the comfort of those who ride in Jackson cars. Notably our Jackson special full elliptic springs, front and rear, made right and tempered right in our own spring plant. Jackson cars are not only practical in every sense, but luxurious in their easy riding qualities.**

NO SAND TOO DEEP—NO HILL TOO STEEP

Jackson Automobile Co., Jackson, Mich.

# Woodworth Treads

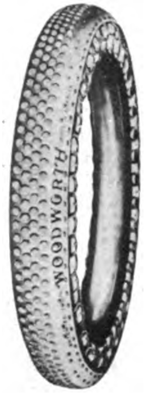
## For 1909

## Woodworth Self-Adjusting Tread

Self-Adjusting

The newest and neatest. Easily attached to the tire and **adjusts itself** quickly without straps or buckles, and **stays adjusted.** The Woodworth **Self-Adjusting** Tread gives the tire absolute protection. It is puncture-proof and prevents skidding. Presents an armored surface to the road and shields the tire perfectly. Is quite invisible when the wheel is in motion.

## Woodworth Adjustable Tread



Adjustable

This popular device will be continued as hitherto. This means that we shall make both the new Woodworth **Self-Adjusting** Tread and the popular Woodworth Adjustable Tread. In ordering be sure to designate the one you want. If you simply order Woodworth Tread the Adjustable Tread will be sent. If you want the **Self-Adjusting** Tread, ask for it. New catalog about ready to send out. Write for it.

## Woodworth "Special" Tread

WOODWORTH
SPECIAL TREAD
FOR
RUTTY ROADS

For rutty roads. This tread is almost indispensable where roads are cut with ruts or unusually rocky or full of deep frozen and rough depressions. The sides of the tread are closely studded with round-headed steel rivets which protect the leather from scouring or grinding against the sides of the ruts and the wear and tear mentioned. They have been in great demand in various parts of the country and have given absolute satisfaction everywhere.

## Woodworth Kant-Skid

protects the tire instead of injuring it. Takes firm hold on the road and makes skidding practically impossible. New sections can be put in when necessary, without tools. Does not injure the road or the tire. Cheaper and better than any all metal device.

**LEATHER TIRE GOODS CO.,** **Newton Upper Falls, Mass.**
**New York Store, 1662 Broadway**

# Thousands of Satisfied Users

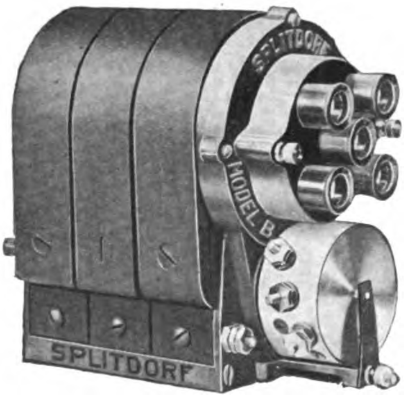
There is never any uncertainty about the operation of the laws of nature.

Certain causes are sure to produce certain results.

Give a boy a new watch and he is bound to be pleased.

Give a man a better article than he can get elsewhere and you can count on his support.

The real basis of the high reputation of **SPLITDORF Ignition Apparatus** is the genuine satisfaction given to its thousands of users. And for this reason alone **SPLITDORF** goods have for many years been considered the standard of quality.



## The SPLITDORF MAGNETO

is the outcome of five years of the most exhaustive experiment and research. We emphatically claim it is

**The Most Scientific in Design**
**The Most Efficient in Operation**
**The Most Carefully Built**
of any Magneto extant.

Besides giving a dual system of ignition from one set of Plugs you can start your motor on a quarter turn of the crank and throttle down to a speed of two and a half miles an hour on the high gear **an exclusive feature of this Magneto.**

Specify the **Splitdorf Magneto** for your 1909 car and you can depend on having the best system of ignition in existence.

**Write Dept. N for our new Magneto catalog**

## C. F. SPLITDORF

**Walton Ave. and 138th St.**
**Branch, 1679 Broadway, NEW YORK**

| CHICAGO | SAN FRANCISCO | DETROIT | BOSTON |
|---|---|---|---|
|  |  |  | Motor Mart |
| 319 Michigan Avenue | 520 Van Ness Avenue | 886 Woodward Avenue | 220 Pleasant Street |

Ninth National

AUTOMOBILE

SHOW

Madison Square Garden, JAN. 16 to 23, 1909 NEW YORK CITY

UNDER THE AUSPICES OF THE

Association of

Licensed Automobile Manufacturers

EXHIBITING STANDARD GASOLINE CARS LICENSED UNDER THE SELDEN PATENT

LICENSED GASOLINE CARS

Apperson
Autocar
Buick
Cadillac
Chalmers-Detroit
Corbin
Columbia
Elmore
E-M-F
Franklin
Haynes
Hewitt
Knox
Locomobile
Lozier
Matheson
Packard
Peerless
Pierce Arrow
Pope Hartford
Pope Toledo
Royal Tourist
Sampson
Selden
Simplex
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Woods

STEAM

White

Complete exhibit by the Motor & Accessory Manufacturers. The only complete Motorcycle exhibit in New York, by the Motorcycle Manufacturers' Association. Commercial Vehicles, Town Cars and Taxicabs

# BOTH RACES AT SAVANNAH!

This remarkable performance positively proves the fact that the Bosch Magneto is the best and most reliable system of ignition obtainable.

Drivers of racing cars, and the leading car manufacturers of the World, are automobile experts. They KNOW what constitutes perfect ignition. Their judgment is based upon years of experience—upon actual ignition tests—upon past performances. That is why they invariably select the Bosch Magneto for ignition equipment.

## In the Grand Prize

18 out of the 20 cars entered were equipped with Bosch Magneto

| | | | | | |
|---|---|---|---|---|---|
| 1 | Fiat | **Bosch Magneto** | 10 | De Dietrich | **Bosch Magneto** |
| 2 | Benz | **Bosch Magneto** | 11 | Simplex | **Bosch Magneto** |
| 3 | Fiat | **Bosch Magneto** | 12 | National | **Bosch Magneto** |
| 4 | Benz | **Bosch Magneto** | 13 | Lozier | **Bosch Magneto** |
| 5 | Clement-Bayard | **Bosch Magneto** | 14 | Itala | **Bosch Magneto** |
| 6 | Renault | **Bosch Magneto** | 15 | Benz | **Bosch Magneto** |
| 7 | Clement-Bayard | **Bosch Magneto** | 16 | Itala | **Bosch Magneto** |
| 8 | Itala | **Bosch Magneto** | 17 | Chadwick | **Bosch Magneto** |
| 9 | Fiat | **Bosch Magneto** | 18 | Renault | **Bosch Magneto** |

## In the Light Car Race

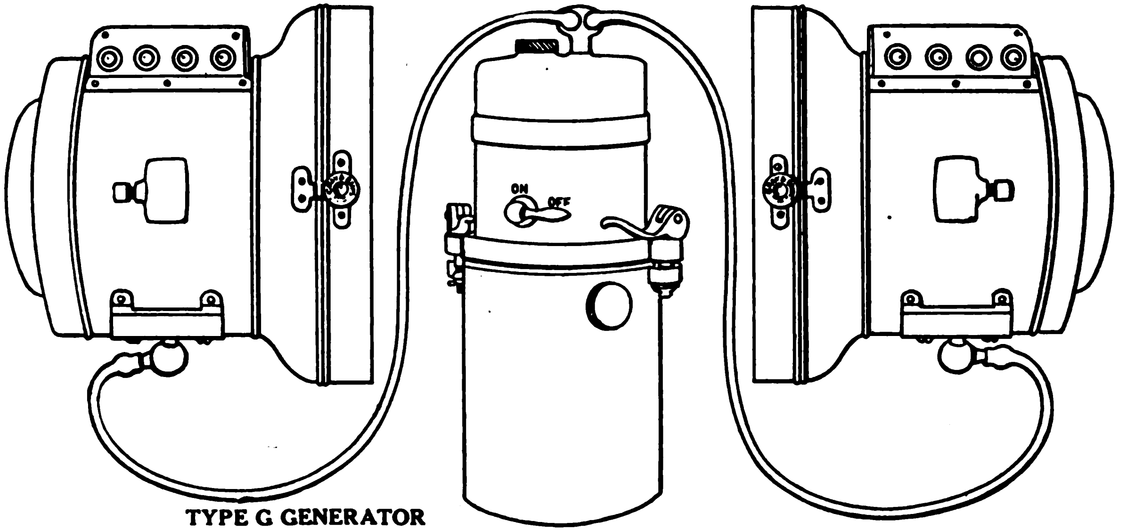
12 out of the 15 cars entered were equipped with Bosch Magneto

| | | | | | |
|---|---|---|---|---|---|
| 1 | Lancia | **Bosch Magneto** | 8 | Maxwell | **Bosch Magneto** |
| 3 | Chalmers-Detroit | **Bosch Magneto** | 9 | Maxwell | **Bosch Magneto** |
| 4 | Buick | **Bosch Magneto** | 10 | Buick | **Bosch Magneto** |
| 5 | Isotta | **Bosch Magneto** | 11 | S. P. O. | **Bosch Magneto** |
| 6 | Maxwell | **Bosch Magneto** | 12 | Chalmers-Detroit | **Bosch Magneto** |
| 7 | Maxwell | **Bosch Magneto** | 15 | Chalmers-Detroit | **Bosch Magneto** |

# BOSCH MAGNETO COMPANY

**223 W. 46th St., New York Chicago Branch: 1253 Michigan Ave.**

Gray & Davis $29.50 RUNABOUT EQUIPMENT



STYLE
No. 967

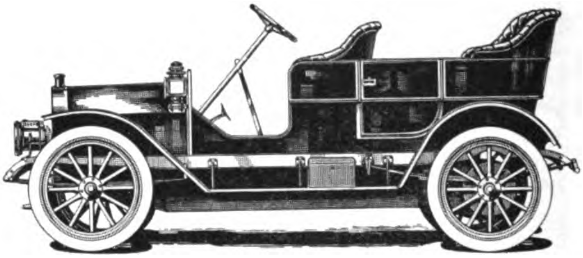
TYPE G GENERATOR

STYLE
No. 967

Consisting of two lamps, Style No. 967, equipped with Gray & Davis Lens Mirrors, and one type G Generator, all of our best quality, thoroughly guaranteed. ¶ Is of a suitable size for Maxwell--Ford--Reo. Lamps are strongly made, splendid light givers and generator is simple, strong and serviceable. ¶ **USERS**---Send in your orders either direct or from your dealer. ¶ **DEALERS**---Send for new lists and terms. Don't delay.

**GRAY & DAVIS - - - - AMESBURY, MASSACHUSETTS**

# The Cartercar is an Automobile with the Trouble Left Out



## New Model "K" Touring Car, $1350

A strictly high-grade five-passenger Touring Car along the latest lines, but retaining the exclusive features that have made the Cartercar a marked success for years.

22-24 H. P., 2 cylinder opposed Motor.

Thermo-syphon cooling system.

Positive mechanical lubrication.

Cartercar Patented Friction.

Transmission. One lever control.

Noiseless Chain drive equipped with patented oil-tight aluminum chain case.

Special arch pattern pressed steel frame.

Long semi-elliptic Springs.

103 inch wheel base.

32 x 3½ inch quick detachable tires.

Luxuriously upholstered.

Finest finish.

$1350, f. o. b. Pontiac.

It's a car which you will buy yourself the second and third time.

It's a car you will advise your most intimate friends to buy.

It's a car your boy can take practically all the care of.

Most of the agents selling Cartercars have sold them year after year.

Every principle in the Cartercar has remained the same from the beginning. They were right and have given automobile satisfaction to the owner—man, woman or boy.

"Simplicity" is the explanation of everything.

The Cartercar is the Friction Driven Car.

It has no clutch to slip—no gears to strip—no water pump to clog—no grease packing—no noise.

It has only one control lever—will climb a 50% grade—has a thousand speeds—will follow a loaded truck or make 40 miles per hour—has our patented dust and oil tight aluminum chain housing—can be depended upon day in and day out.

Do you wonder owners and dealers alike recommend them?

Write if you are interested. Descriptive literature will be mailed promptly.

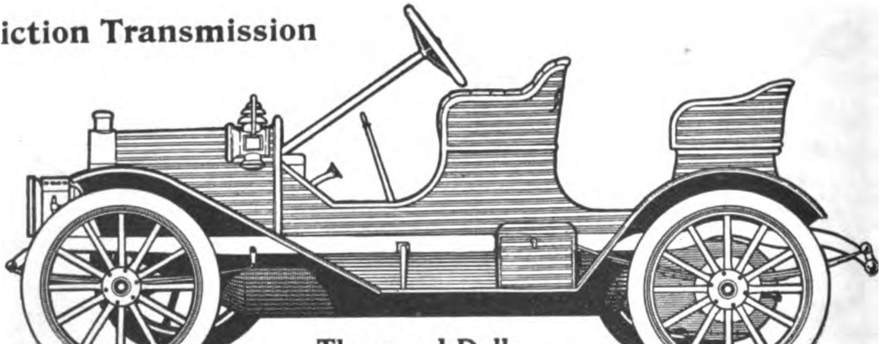
At New York Show, Dec. 31 to Jan 7

At Chicago Show, Feb. 6 to 13.

---

**Cartercar Company**
**PONTIAC, MICH.**
*Member A. M. C. M. A.*

**Friction Transmission**



Thousand Dollar
Model "H" Gentlemen's Roadster

# Lists of Garages

## Auto Supply Dealers, Jobbers, Auto Manufacturers, Auto Agencies

8000 names of Bona-fide concerns as per the above. Only those listed that should get your discount sheet.
**99 per cent. of your postage guaranteed.**

# Lists of Auto Owners

We supply certified copies of the list of Auto Owners in each state where the laws governing the same are enforced.

## New Auto Owners Names Daily

We supply our subscribers with the new registrations of Auto Owners daily, weekly or monthly, in such territory as they may desire.

## Monthly Summaries of Cars Sold

by each manufacturer is sent to our subscribers without extra charge.

## Lists of Auto Clubs, Motor Boat Clubs, Motor Boat Owners, Gas Engine Builders, Motor Cycle Builders, Auto Engine Builders and Chauffeurs.

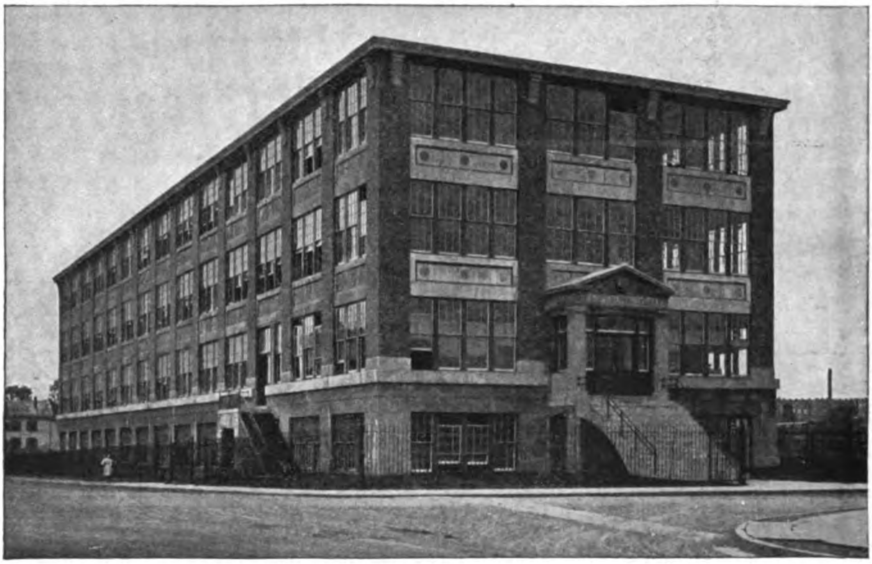
# Auto Directories Co., Inc.

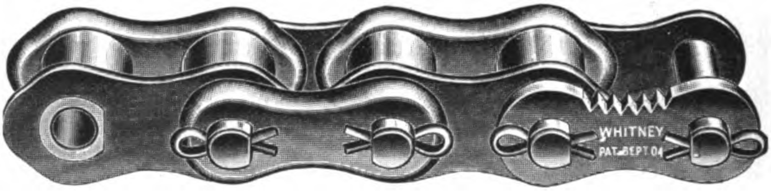
## 1717 Broadway, New York City

**Phone 858 Columbus**

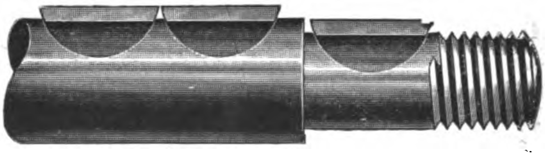
# "WHITNEY" CHAINS

are now made in one of the most
modern of American fire-proof factories





They have been used on many cars in the Vanderbilt and Briarcliff Cup Races and have never failed to make perfect records in these events.



If you are not taking advantage of the Woodruff Patent System of Keying it will pay you to investigate.

Better results and a great saving in cost.

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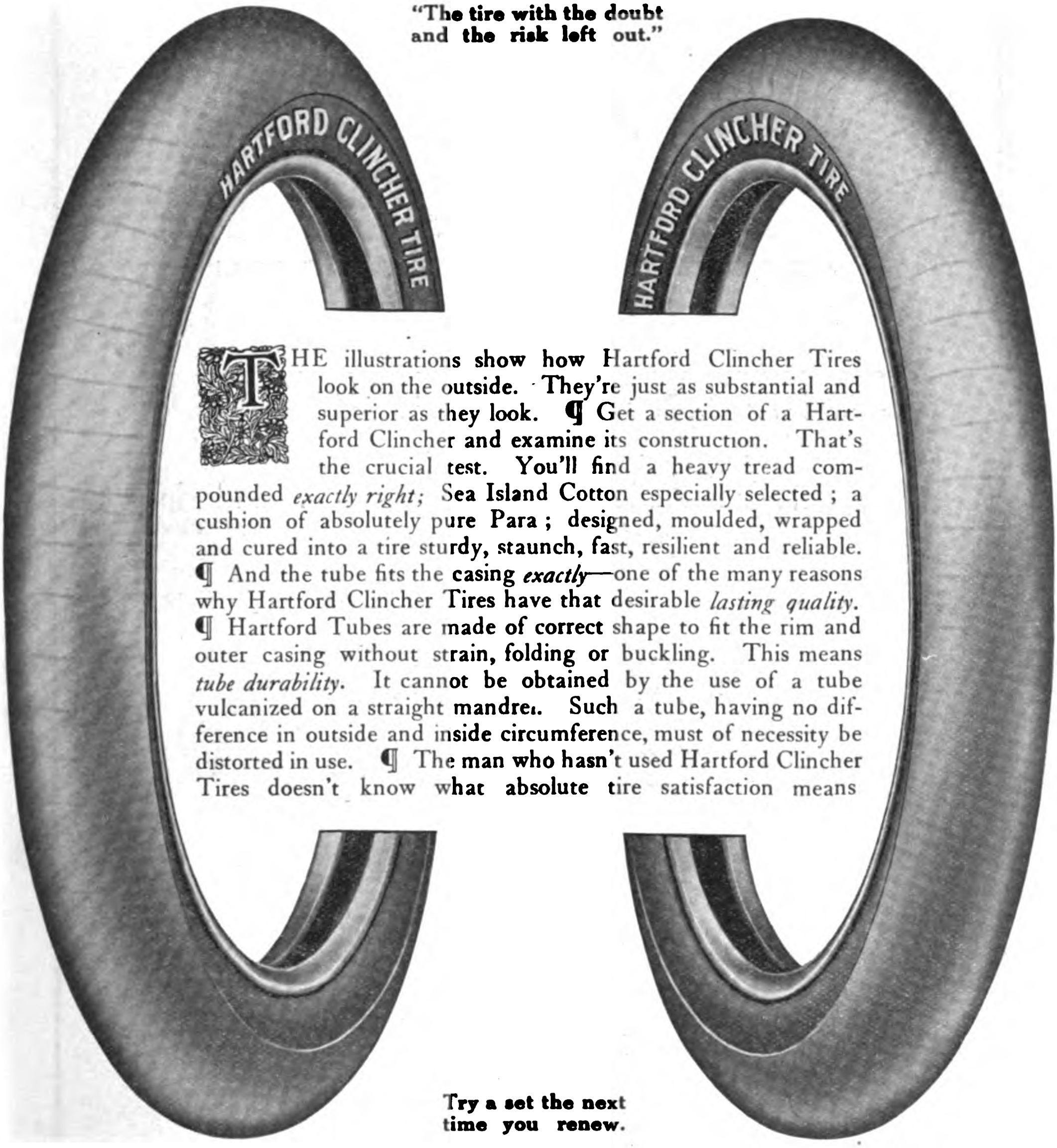
## THE WHITNEY MFG. CO.

HARTFORD - - - CONNECTICUT

# Hartford Clincher Tires



**"The tire with the doubt and the risk left out."**

THE illustrations show how Hartford Clincher Tires look on the outside. They're just as substantial and superior as they look. ¶ Get a section of a Hartford Clincher and examine its construction. That's the crucial test. You'll find a heavy tread compounded *exactly right;* Sea Island Cotton especially selected ; a cushion of absolutely pure Para ; designed, moulded, wrapped and cured into a tire sturdy, staunch, fast, resilient and reliable. ¶ And the tube fits the casing *exactly*—one of the many reasons why Hartford Clincher Tires have that desirable *lasting quality.* ¶ Hartford Tubes are made of correct shape to fit the rim and outer casing without strain, folding or buckling. This means *tube durability.* It cannot be obtained by the use of a tube vulcanized on a straight mandrel. Such a tube, having no difference in outside and inside circumference, must of necessity be distorted in use. ¶ The man who hasn't used Hartford Clincher Tires doesn't know what absolute tire satisfaction means

**Try a set the next time you renew.**

## THE HARTFORD RUBBER WORKS CO.

### HARTFORD, CONN.

**BRANCHES**

**NEW YORK, 57th Street and Broadway; CHICAGO, 83 Michigan Avenue; BOSTON, 817 Boylston Street; DETROIT, 256 Jefferson Avenue; DENVER, 1564 Broadway; PHILADELPHIA, 1425 Vine Street; ATLANTA, GA., 94 North Pryor Street; BUFFALO, 725 Main Street; CLEVELAND, 1831 Euclid Avenue.**

**AGENCIES**

**Pierson-Wilcox Elec. Co., Minneapolis; Mercantile Lumber and Supply Co., Kansas City; St. Louis Tire Agency, St. Louis, Mo.; Chanslor & Lyon Motor Supply Co., 930 S. Main St., Los Angeles, Cal.; 542 Golden Gate Ave., San Francisco, Cal.; F. P. Keenan Co., Portland, Ore., Compania Mexicana de Vehiculos Electricos, City of Mexico.**

Nearly Every One Knows

THAT

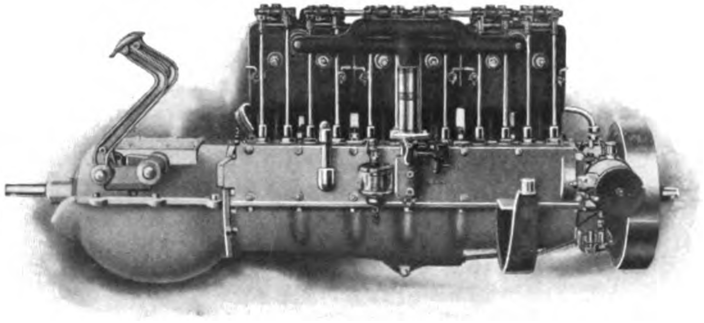
**BROWNELL MOTORS**

FOR 1909 ARE

EMINENTLY SUPERIOR

IN

design, construction, power, economy, and in perfection of details



**POWER UNIT**

**Model A-6, 6-Cylinder, 20-25 H. P. Automobile Motor**

This complete power unit (in both 4 and 6 cylinders) is unqualifiedly the most desirable proposition on the market for the Automobile manufacturer or assembler.

Hence it's great popularity. Our line embraces Motors for a great variety of purposes, in 4, 6 and 8 cylinders, from 14 to 150 H. P.

A postal—a catalog.

**F. A. Brownell Motor Company**
**ROCHESTER, N. Y.**

THE MOST SATISFACTORY

**Varnishes**

For the AUTOMOBILE TRADE are those manufactured by the

**Columbus Varnish Co.**

**Columbus, Ohio**

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| **Automobile Rubbing Varnish** | A medium rubbing varnish, light in color, elastic, flows nicely and can be rubbed without sweating in from two to three days. |
| **Automobile Finishing Varnish** | A pale varnish of great brilliancy and durability, for finishing coat only. It works with great freedom, dries out of the dust inside of twelve (12) hours, and hardens in 2 to 3 days. One coat is sufficient over our RUBBING BODY VARNISH. |
| **Pale Automobile Finishing Varnish** | The same as our Automobile Finishing Varnish, excepting that it is paler. |
| **Crown Paint and Varnish Remover** | A liquid paint and varnish remover. Will leave the surface perfectly clean and ready for refinishing. |

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The COLUMBUS VARNISH CO., Columbus, Ohio

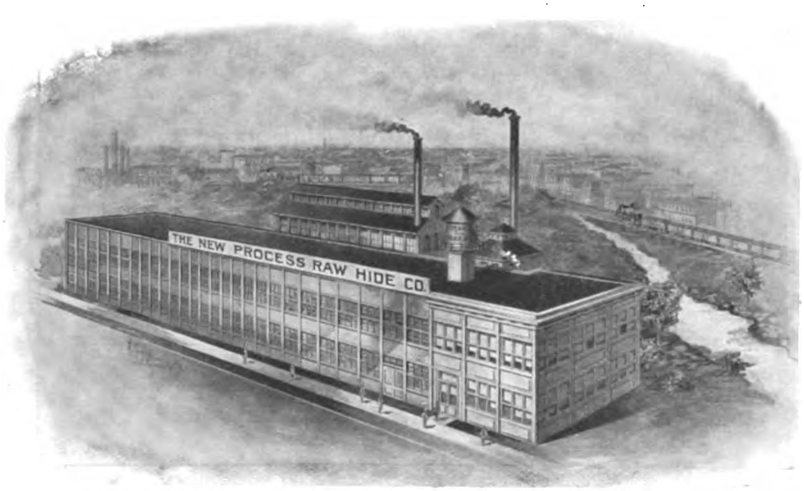
# GEARS

## ACCURATE WORK GUARANTEED

WE have one of the largest and best equipped plants in the country for turning out accurate gears of any kind and material, and in any quantity. Have 40 gear-cutting machines including Fellows Gear Shapers, Brown & Sharpe and Gould & Eberhardt Rotary Cutters and 14 Gleason Generators for bevel work and three special hobbing machines for spirals, herring bone and helical gears. Our lathe equipment is in keeping and includes the best types of automatic screw machines and turret lathes taking stock through the spindle up to 4½″ diameter. We have three large hardening furnaces fitted with a pyrometer system and are thoroughly familiar with the proper treatments of the special steels. And we have a reputation for the high quality of our work, which is second to none.

*SEND US YOUR BLUEPRINTS FOR ESTIMATES*

THE NEW PROCESS RAW HIDE CO.
SYRACUSE, N. Y.


THE NEW PROCESS RAW HIDE CO.

# The Superiority

OF

# Standard Bearings

**is due to the absolute harmony of their various parts—not one feature here and there, but a combination of all that is best in bearing design, material and construction.**

**Wherever used, they prove their superiority—they run better, wear better and are better in every respect.**

SEND FOR NEW CATALOG

**Standard Roller Bearing Company**
PHILADELPHIA, PENNSYLVANIA

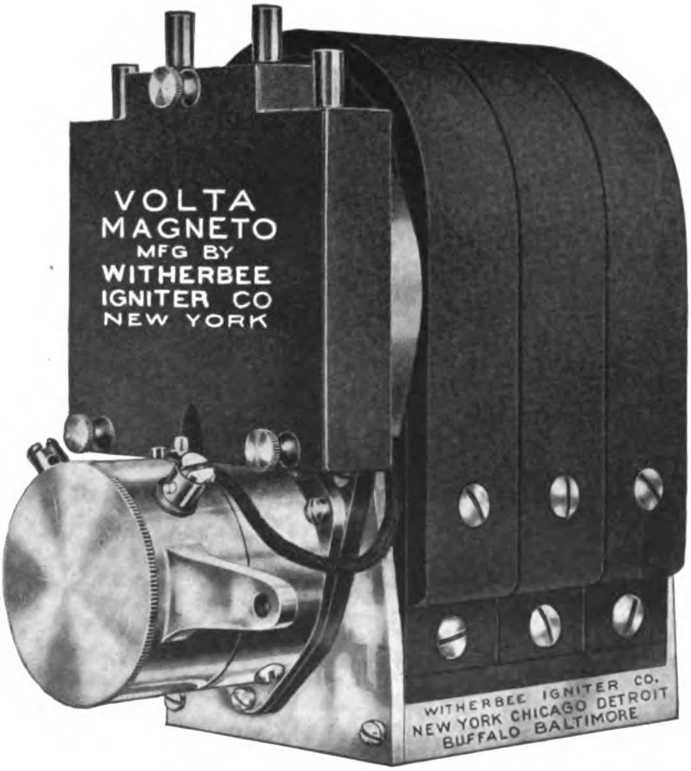
THE WONDERFUL SUCCESS OF

*The* VOLTA

MAGNETO

**is due to the fact that it represents the latest and most improved ideas in magneto construction. It is a decided advance in design over any other Magneto on the market.**

***Write for particulars. Witherbee for Ignition.***


VOLTA
MAGNETO
MFG BY
WITHERBEE
IGNITER CO
NEW YORK
WITHERBEE IGNITER CO.
NEW YORK CHICAGO DETROIT
BUFFALO BALTIMORE

**Wico Charging Device Wico Ignition Wire Wico Spark Plugs**
**Witherbee Batteries Wico Inspection Lamp**

**Witherbee Igniter Co., 1876 Broadway, N. Y.**

**CHICAGO, 1429 Michigan Ave. DETROIT, 220 Jefferson Ave.**
**BUFFALO, 43 E. Eagle St. BALTIMORE OFFICE, 604 Continental Bldg.**

# THE BEST SPARK PLUG MONEY CAN BUY IS

# THE WICO

IT is the most efficient plug for any engine. It is THE plug you want for your engine. It is impossible to build a better spark plug. IT HAS the Micrometer Adjustment Feature, which enables you to set the spark gap to a Known distance—1-1000 of an inch. IT CAN be cleaned without disturbing the packing or removing the shell from the cylinder. It does not foul. IT IS guaranteed against porcelain breakage by heat or defects in material. The guarantee is packed with the plug.

WICO
PATENT
APPL'D FOR

**Try these plugs once—you will never be without them. Ask your dealer or send $1.00 for a sample plug. A handsome Roycroft case with each order for 5 or 7 plugs.**

*WITHERBEE FOR IGNITION*

**Wico Charging Device** **Wico Ignition Wire** **Wico Spark Plugs**
**Witherbee Batteries** **Wico Inspection Lamp**

## WITHERBEE IGNITER CO.

**Makers of the Famous Witherbee Battery**

**Chicago, 1429 Michigan Ave.** **Detroit, 220 Jefferson Ave.**
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RADIATORS STEEL FRAMES LUBRICATORS
HOODS FENDERS MUFFLERS
MUD PANS

**Go to**
**THE KINSEY MFG. CO.**
**DAYTON, OHIO**
**for**
**AUTOMOBILE PARTS**

*Ask for Catalogue*

FANS
HOOD FITTINGS BRASS BEADINGS
GASOLINE TANKS DASHES BATTERY BOXES

## See that the name JONES Appears on the Speed-Indicator You Buy for Your 1909 Car!

# Jones Speedometer

Is the most accurate, reliable and handsomely finished speed-indicator obtainable. The *Jones* line comprises the largest assortment of models and the greatest range of prices to be had in the speed-indicator field. The purchaser not only secures the **STANDARD SPEED-INDICATOR OF THE WORLD,** but has the privilege of selecting the **exact** instrument desired at a price **commensurate** with the cost of his car. In the 1909 line there are **20 different instruments ranging in price from $15.00 to $100.00. Speedometer and Clock Combinations (Chelsea Movement) from $55.00 to $150.00.**

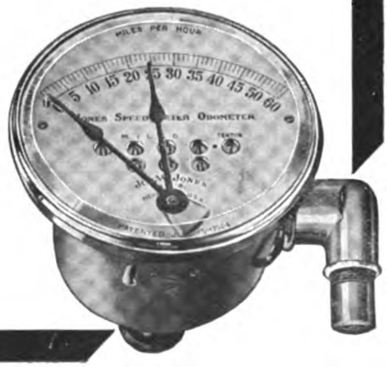
**WRITE FOR 1909 FOLDER CONTAINING ALL JONES MODELS TOGETHER WITH PRICES**

***We Exhibit at Grand Central Palace and Madison Square Garden Shows***

## The Jones Speedometer

**76th Street and Broadway, NEW YORK**

CHICAGO, 1421 Michigan Avenue
PHILADELPHIA, 259 North Broad Street
BOSTON, 109 Massachusetts Avenue
CLEVELAND, 1841 Euclid Avenue
LOS ANGELES, 930 South Main Street
HARTFORD, 284 Trumbull Street
SAN FRANCISCO, 544 Golden Gate Avenue
DETROIT, 247 Jefferson Avenue
BALTIMORE, 26 Franklin Building
PORTLAND, OREGON, 306 Oak Street
DENVER, 1542 Broadway
ST. LOUIS, 4630 Olive Street



# Quality Castings at Right Prices

OUR foundry has the capacity for making eight tons of castings per day, varying in size from a few ounces to one ton. This insures prompt delivery if you place your order with us.

¶ As to quality,—our customers tell us they save considerably in the machining of their castings, owing to the work being done in the mould, rather than in the machine shop. Our range of products covers

## ALUMINUM, ALUMINUM BRONZE, MANGANESE BRONZE, BEARING METALS and SPECIAL MIXTURES

¶ Our plant is an up-to-date one in every respect. The main building is about 300 feet long and 65 feet wide. It is built of concrete and steel, of deck construction, and is practically three-quarters glass. The latest and most improved machinery and methods are employed, with the result that we are able to give you quality castings at right prices.

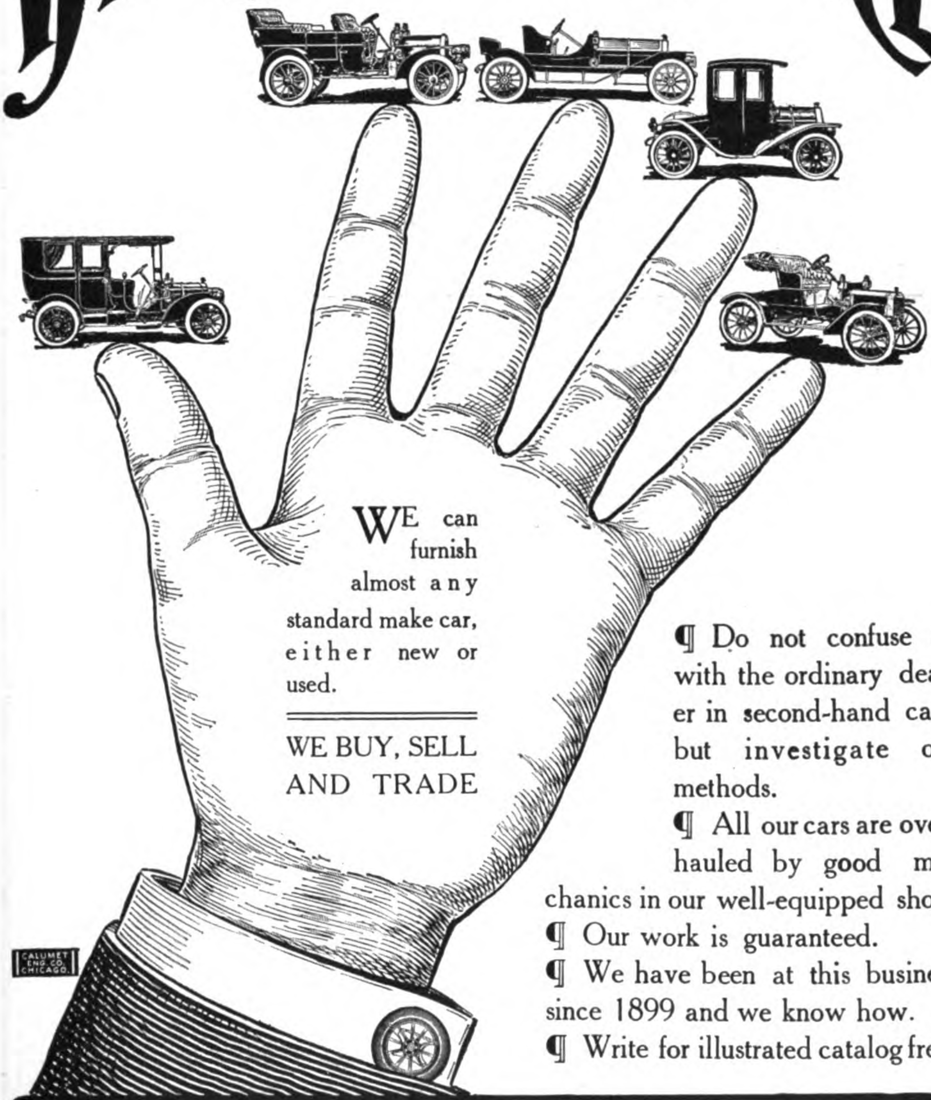
¶ We have furnished castings for cars which have competed in nearly all of the contests this season, and those cars have been winners. Under the most severe strains our castings stand the test. They are not made of scrap, but of the **best pure ingot metals.**

**Millett Castings Can Always Be Depended On For Service**
**MAY WE QUOTE YOU PRICES?**

## MILLETT BRASS COMPANY

**HIGHLAND STATION, SPRINGFIELD, MASS.**

# TAKE YOUR CHOICE


CALUMET ENG. CO. CHICAGO.

WE can furnish almost any standard make car, either new or used.

---

WE BUY, SELL AND TRADE

¶ Do not confuse us with the ordinary dealer in second-hand cars, but investigate our methods.

¶ All our cars are overhauled by good mechanics in our well-equipped shop.

¶ Our work is guaranteed.

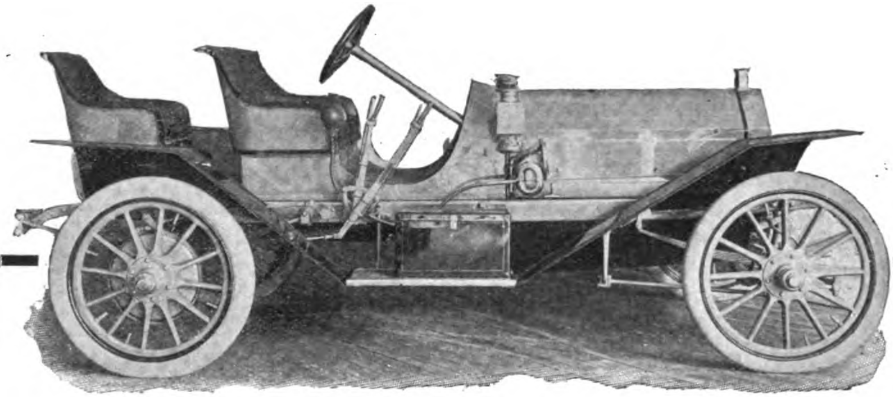
¶ We have been at this business since 1899 and we know how.

¶ Write for illustrated catalog free.

## NYBERG AUTOMOBILE WORKS

MANUFACTURERS AND DEALERS

2436-38 MICHIGAN AVE.~ CHICAGO, ILL.



# The BENNER Six

## $1750.00

The knowledge gained by years of repair work experience, during which every make of automobile has come to the notice of our designer, with ITS WEAK POINTS EXPOSED THROUGH FAILURE, has resulted in the development of THE BENNER POWER PLANT, which is years in advance of anything heretofore produced.

The six cylinders are cast in pairs with valves in head completely surrounded by water The bore is 3½″, stroke 4″, H. P. 25-30 and speed from 5 to 50 miles on high.

The Engine, Multiple Disc Clutch and Sliding Gear Transmission are in one unit, flexibly supported on three points.

Mechanically perfect, it is the acme of compactness, simplicity and accessibility, and the materials used throughout are of highest quality and best adapted to the uses to which they are put.

The oiling system is unique, being self-contained and economical. None of the oil is wasted and the supply to the cylinders can be controlled, thereby removing the most prolific cause of carbonization with its attendant troubles. The body is of metal, built on beautiful and racy lines and upholstered with best white curled hair and hand buffed leather.

The space at our disposal does not permit of more details. Our claims may appear extravagant, but they are in reality moderate.

We are not experimenting on the public, having given our car a thorough try-out and can "make good."

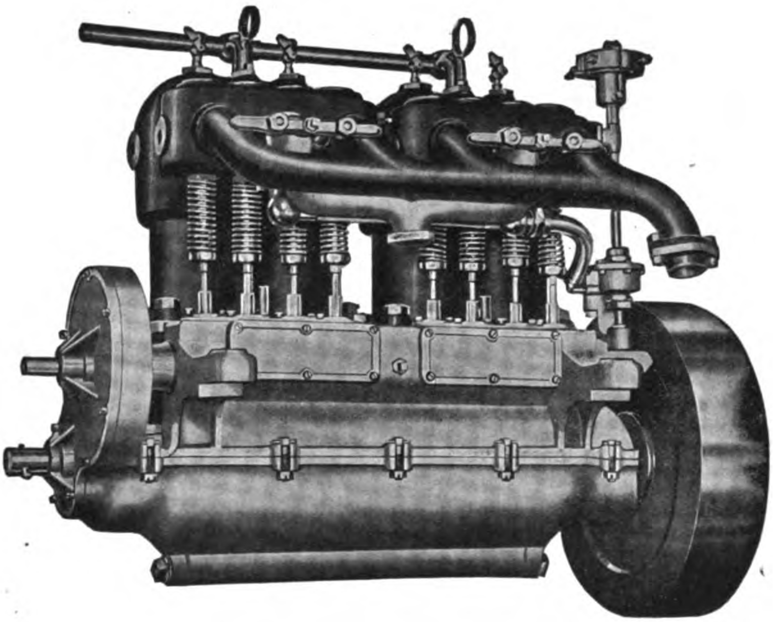
An inspection is all we ask. A demonstration all we need.

If you cannot call on us write for Catalog A.

**THE BENNER MOTOR CAR CO.**
**1677 BROADWAY, NEW YORK**

# High Grade Beaver Motors

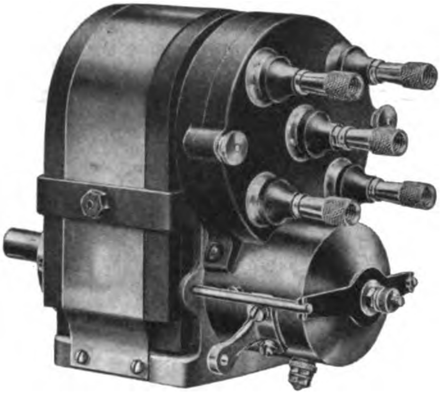
## WORK LIKE BEAVERS
## Silent, Sure, Satisfactory



**6 Cylinder Vertical, 4⅜ x 4¾**
**4 Cylinder Vertical, 4⅜ x 4¾ and 4¾ x 5¼**
**2 Cylinder Horizontal Opposed, 4⅜ x 4 & 4¾ x 4 & 5⅛ x 4½**
**4 Cylinder Horizontal Opposed, 5⅛ x 4½**
**The 4 Cylinder Horizontal Opposed Motor is Designed Specially for Commercial Trucks**
**Center Crank Oiling Device**
**All Motors are Four Cycle**
**WRITE FOR FREE BOOKLET**

## Beaver Mfg. Co.

783 Chase St., Milwaukee, Wis.



# Announcement to Manufacturers

LATEST!
BEST!
CHEAPEST!

Kurtz

# HIGH TENSION MAGNETO

**At the request of the Hess-Bright Mfg. Co. we have changed the name of our Magneto from Hess to Kurtz.**

**LATEST**—Because it is.

**BEST**—Because we can produce a *hotter* spark at a *lower* speed. Our *armature* has *improvements* not found on any other Magneto. Has *one-third* less parts than any other Magneto which means simplicity and of course increases the reliability. Constructed under our *original* patents, by which method we can reduce the number of parts as well as increase the efficiency.

**CHEAPEST**—Because it stands higher in efficiency and reliability. We can *afford* to sell cheaper not by giving you something inferior, but can do it only by using our *patented construction*, and reducing the parts and complications to a minimum.

**We have the largest line of Magnetos on the market. We *actually sold more* Magnetos for 1908 than any other concern. A strictly American product, guaranteed to have the efficiency and quality of the best on the market.**

**We are offering nothing freakish. Built on established principles. Efficiency and durability our one aim.**

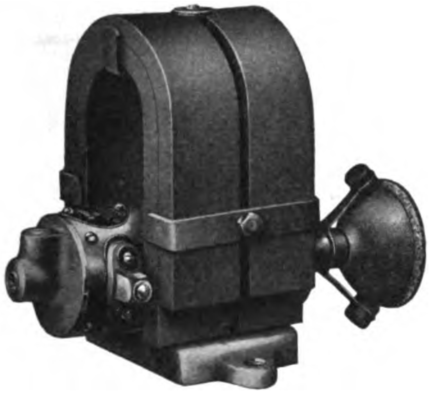
**HERCULES goods sold absolutely on their merits. Write Dept. "H. T."**

## HERCULES ELECTRIC COMPANY

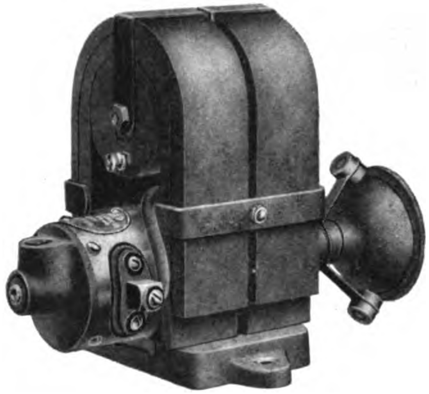
INDIANAPOLIS :: :: :: :: INDIANA, U. S. A.

# Direct Current Magnetos

**STAR**



**WIZARD**



## SURPASS EVERY OTHER MAKE FOR RELIABILITY AND EFFICIENCY

## *WHY?*

Because our goods have been sold absolutely upon their merits. Because we have the largest and best equipped factory Because we control **original construction** patents which enable us to obtain the most **powerful** and **efficient** Magneto ever built. Because our patents and superior equipment, together with our enormous output, enable us to spend more money on our goods, and at the same time put them on the market at an extremely low figure.

Our **contracts** cover a majority of the **largest** and **most prominent** stationary and marine engine builders in the country. WHY have we been able to hold this trade year after year?

**ABSOLUTE SATISFACTION**

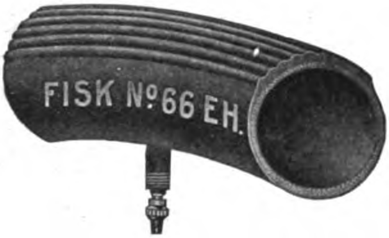
**EFFICIENCY DURABILITY LOW COST**

¶ Largest line of Magnetos ever offered for Automobiles, Tractors, Portables, Producers, Marines. Works with any standard coil. Speed controlled absolutely, so your coil cannot be injured. We have backed our **claims** for more **than five years** with a 30-DAY free trial. Make-and-break or Jump-spark; Belt or Friction Governor. Write **Department "D. C." Catalog Free.**

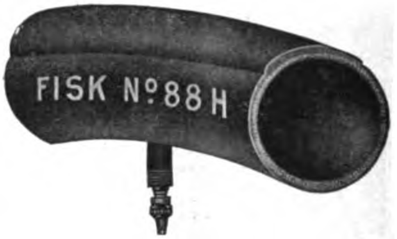
**HERCULES ELECTRIC COMPANY**

**INDIANAPOLIS :: :: :: :: INDIANA, U. S. A.**

# For the Up-to-Date Bicycle Dealer


FISK No. 66 EH.

TWO
OF
THE
BEST



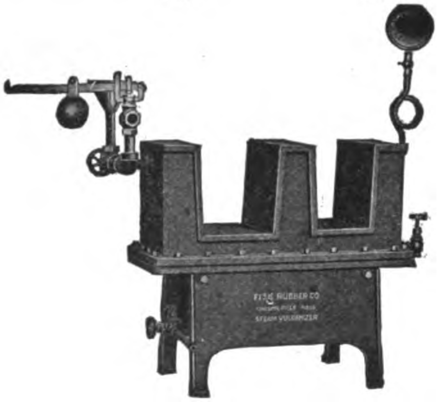
# FISK BICYCLE TIRES

A strictly high-grade line of Guaranteed Tires recommended to all dealers who are looking for ***THE BEST.***

**Write Our Nearest Depot for Prices**

# FOR THE REPAIR MAN

## Fisk Repair Shop Outfit and Materials



VULCANIZING
CEMENT
ONE GALLON
THE FISK RUBBER CO.

**We make a complete line of uncured stock, coated fabrics and cements for repairing tires.**

**Fisk Steam Vulcanizer equipped with Gas Burner for Bicycle and Automobile Tire Repairing. Send for Booklet on Repair materials.**

COVER STOCK

**THE FISK RUBBER COMPANY, Chicopee Falls, Mass.**

**FISK DEPOTS:**

BOSTON—239 Columbus Avenue
SPRINGFIELD—135 Bridge Street
NEW YORK—1725 Broadway
PHILADELPHIA—1309 Race Street
ATLANTA—103 North Pryor Street
BUFFALO—718 Main Street
CLEVELAND—1942 Euclid Avenue
DETROIT—262 Jefferson Avenue

CHICAGO—1440 Michigan Avenue
ST. LOUIS—3907 Olive Street
MINNEAPOLIS—820 Hennepin Avenue
ST. PAUL—76 West Seventh Street
KANSAS CITY—1604 Grand Avenue
DENVER—1534 Glenarm Place
SEATTLE—910-12 East Pike Street
LOS ANGELES—722 So. Olive Street

SAN FRANCISCO—406 Golden Gate Avenue

# MIDLAND

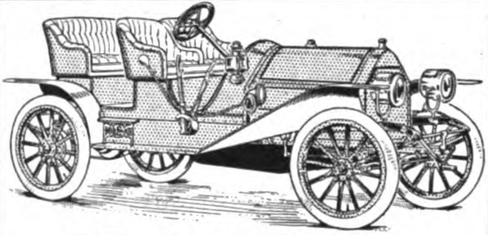
## Built Right Looks Right Stays Right

**Midland cars are right.**

They have made good. They are making good every day and they always will make good.

Why?

Every car that leaves our factory is perfect in every part and has been thoroughly tested before it is shipped. The Midland is 100 per cent. right from head to tail light. Our margin of profit is small and instead of spending our money on "contests" and "freak advertising" we spend it for improvements on the machinery and workmanship on Midland Cars. Our price is the lowest ever quoted on a car of Midland quality—and the Midland is one of the very best cars made. The model of G-9 is $2250, Model E $1800, Model F $2250.



Midland Model "G-9," $2250

### SPECIFICATIONS

30-35 H. P. Four cylinders; water cooled, 4½ x 5¼ cast in pairs and offset valves all on one side; bearings best nickel babbitt; floating disc clutch with cork inserts; roller bearings and ball-bearing thrust collar; small brake enables noiseless gear change; coil spring torsion shock absorber; selective transmission; three forward speeds, one reverse; nickel steel gears; positive pump lubrication; all in crank case; Remy magneto and dry cell ignition; worm and nut irreversible steering; spark and throttle levers above steering wheel; auxiliary foot throttle; pressed steel frame with up-shoot over rear axle; special Timken axles; full floating rear; one-piece I beam front; 14-inch brake drum; internal and external brakes with 2½-inch face in 14-inch drum; "Thermoid" lining; wheel base 118 inches; 36 x 4 Firestone tires; semi-elliptical front springs; full elliptical rear; "Midland" flat vertical tube radiator; six blade ball bearing fan; straight line touring car body; carries five passengers, with ample room for two small extra seats; "Midland" red color; rich and durable; carries two gas lamps and generator; two dash oil lamps and rear oil lamp; tube horn; tool kit in canvas case; tire repair outfit and jack; price $2250.

Every owner of a Midland is a booster.

Ask any of them—you can find them everywhere—how he likes car, and hear him praise it.

Every agent who handled the Midland last year is handling it this year, with an increased order.

Satisfied owners and satisfied dealers are the best possible proofs of a car's merit. If we could take you through our factory and show you—step by step—how carefully we make this car, you would be amazed. Midlands run silently and smoothly and the mechanism is simple and accessible, enabling any owner to attend to his own car.

Look at the Midland before you buy.

## Built with Care by Men Who Know

Our methods are the result of years of experience. Our designers are the working experts who have studied and traveled at home and abroad. Its outward appearance is stylish, neat and trim. The finish is perfect, the lines are pleasant. We use only the best materials. We look to detail. The ratio of bore and stroke and diameters of values is correct—the cam action is right—the power and weight are correctly proportioned. Midland machinists are at your service even after you buy the Midland. You want a car that is the result of experience and knowledge. See the Midland.

# MIDLAND

## Light Compact Powerful

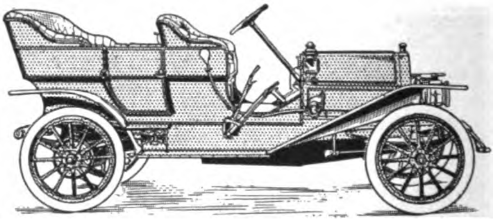
We aim to get the greatest possible strength with the least possible weight in the Midland.

No motor has ever been made that is lighter—stronger—more powerful—simpler in design, or more convenient to oil, clean and examine.

In the "four" the cylinders are cast in pairs. All valves are on one side and operated by one shaft.

The cooling is done uniformly. No part gets hotter than others. This gives the explosions full force.

Our clutch is a multiple disc, with cork inserts, unaffected by oil or the lack of it. It takes hold gently but firmly—no slipping—no jars.



Midland Model "E," $1800

It was designed by experts and it is made by experts. It is perfect in action.

**There are few parts** to the mechanism, which reduces the chances of its getting out of order.

The crank shaft is "offset" so that the full power of the explosions acts on the pistons just when the crank is at the easiest turning point. This reduces friction to the minimum.

The whole power plant is put into the smallest space compatible with the best results, and is all on a sub-frame.

You cannot afford to overlook the Midland in buying a car.

### SPECIFICATIONS

25-30 H. P. Four cylinders, 4¼ x 5 inches, water cooled; valves on opposite sides; bearings best nickel babbitt; floating disc clutch with cork inserts; roller bearings; ball-bearing thrust collar; small brake enables noiseless gear change; coil spring torsion shock absorber; selective transmission; three forward speeds; one reverse; nickel steel gears; mechanical oiler; sight feeds on dash; Pittsfield mechanical igniter; worm and nut irreversible steering; spark and throttle levers above steering wheel; auxiliary foot throttle; muffler cut-out; pressed steel frame; power plant on sub-frame; semi-floating axles with roller bearings: Timken I-beam front; double brakes on rear wheels; wheel base 112 inches; 34 x 3½-inch Firestone tires; semi-elliptical front springs; full elliptical rear; vertical flat tube radiator; distinctive "Midland" design; carries 5 passengers (Roadster 4); leather trimmed over best curled hair and springs; "Midland" red color (Roadster, gray); carries two gas lamps with generator; two dash oil lamps and rear lamp, horn, tool kit, and tire repair outfit; price, $1800.

# MIDLAND

## Strong Smooth Silent

WE KNOW HOW to get the best material and machinery and how to put it into a car to the best advantage.

These economies mean not only economy for the buyer, but strength and durability for the car.

The Midland is equipped with Timken (never break) front and rear axles and with Timken roller bearings. It has the direct shaft drive to bevel gears on the rear axle.

The wheel base is 112 and 118 inches in different models. This, with perfect hanging on the springs insures not only long life to the car but comfort and ease to the passengers.

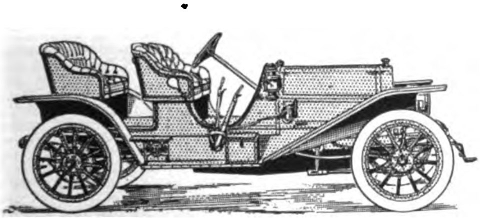
The Midland gives you a smooth ride. It does not jolt you from the seat at every bump, nor hurl you from side to side in the tonneau.

Excellent workmanship on its machinery does away with "end shake" and consequent noise.

A small friction brake and torsion shock absorber make the changing of gears quiet and easy.

The 1909 Midland will be exhibited at the New York Grand Central Palace Auto Show, space D 30, opening New Year's Eve, and at the Chicago Show, which opens Feb. 6th.

Inspect it and you will see that it is a car of strength. You can see why it runs smoothly and silently.



**Midland 1909 Model "F," $2250**

### SPECIFICATIONS

30-35 H. P. Four cylinders; water cooled; 4½ x 5¼ offset and cast in pairs; valves all on one side; bearings best nickel babbitt; gears enclosed and running in oil; floating disc clutch with cork inserts; roller bearing; ball thrust bearing; small brake enables noiseless gear change; coil spring torsion shock absorber; selective transmission; nickel steel gears, running in oil; splash lubrication and positive feed oiler; Remy magneto and dry cell ignition; worm and nut irreversible steering; spark and throttle levers above steering wheel; auxiliary foot throttle; pressed steel frame Timken axles; semi-floating rear; one piece I beam front; internal and external brakes with 2¼-inch face in 14-inch drums; external adjustment; wheel base 112 inches; 34 x 4 Firestone tires; semi-elliptical front springs; full elliptic rear; flat tube radiator, "Midland" design; carries four passengers; upholstering of green tufted leather; "Midland" gray color; carries two gas lamps and generator; two dash oil lamps and rear oil lamp; tube horn; tool kit in a canvas case; tire repair outfit and jack; price $2250.

# MIDLAND

## Every Car Proven

We will be in the automobile business next year—and the year after. We will be making Midlands, and making them to sell.

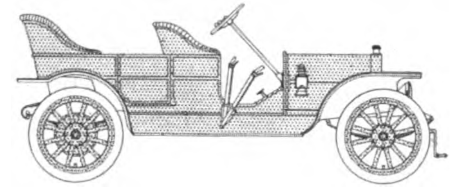
Therefore, it pays us now to make them right.

We build from designs that are proven by experience to be right.

We build with proven material.

Our builders have proven themselves experts through years of practical work.

Owners every day are proving that our car meets all the requirements of every-day use, gives entire satisfaction, and is well worth what they paid for it.



**"Midland" Model "F-9," $2250**

**SPECIFICATIONS**

30-35 H. P. Four cylinders; water cooled, 4½ x 5¼ cast in pairs and offset valves all on one side; bearings best nickel babbitt; floating disc clutch with cork inserts; roller bearings and ball-bearing thrust collar; small brake enables noiseless gear change; coil spring torsion shock absorber; selective transmission; three forward speeds, one reverse; nickel steel gears; positive pump lubrication; all in crank case; Remy magneto and dry cell ignition; worm and nut irreversible steering; spark and throttle levers above steering wheel; auxiliary foot throttle; pressed steel frame with up-shoot over rear axle; special Timken axles; full floating rear; one-piece I beam front; 14-inch brake drum; internal and external brakes with 2½-inch face in 14-inch drum; "Thermoid" lining; wheel base 118 inches; 36 x 4 Firestone tires; semi-elliptical front springs; full elliptical rear; "Midland" flat vertical tube radiator; six blade ball bearing fan; straight line touring car body; carries five passengers, with ample room for two small extra seats; "Midland" red color; rich and durable; carries two gas lamps and generator; two dash oil lamps and rear oil lamp; tube horn; tool kit in canvas case; tire repair outfit and jack; price $2250.

## We Will Prove to You

that all we say is true, if you will write to us directly or through any of our agents, for our Free Auto Book.

It shows pictures and tells you in plain English what a wonderful car we build.

Whether you know autos or not the book is easily understood. You will know something about autos when you've read the book—and you'll know why the Midland excels.

Write for this book to-day. Find out for yourself the hard-boiled truth about this popular car. Know for yourself that "Midlands" are **made right, look right** and **stay right.**

## Each Car is Tested by Us

and proven perfect before it leaves the factory.

Each part is tested before it is put into a Midland.

The time we spend on our cars **after they are finished** is not wasted, even if it should decrease the number of sales.

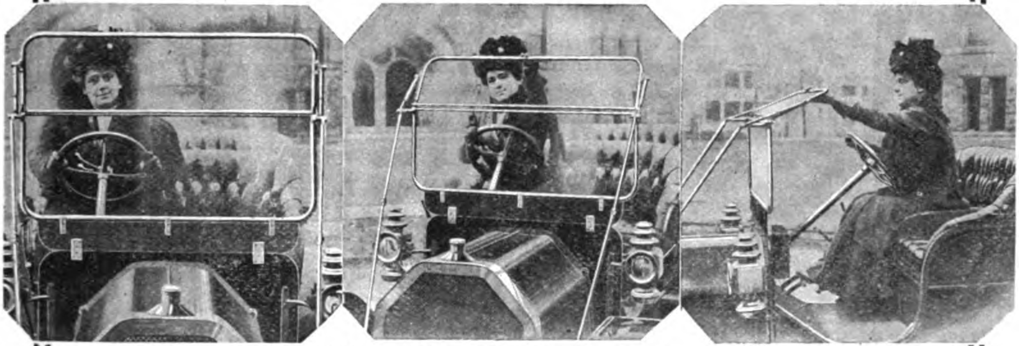
We prefer to sell fewer cars and be sure that the buyers are satisfied.

That's why you so seldom hear of a "Midland" being out of order They're still "our machines," even after you own them.

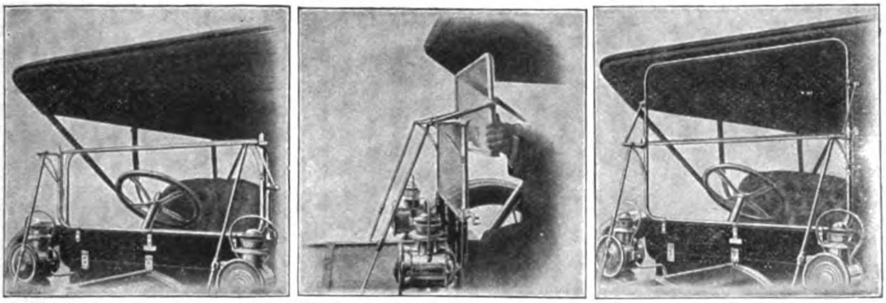
## THE MIDLAND MOTOR CO., Moline, Ill.

# Rands Automatic

# Wind Shields and Tops

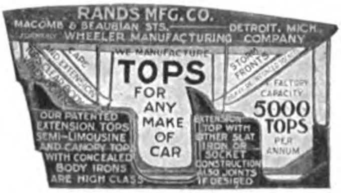


The above is our No. 7 Rands Automatic Wind Shield operated with one hand from seat.



No. 5 Rands Collapsible Wind Shield designed for cars on which steering wheel is too close to dash for operation of No. 7.

**We also make**
Tops
Lamp Brackets
Foot Rails
Trunk Racks
Coat Rails
Tire Irons


RANDS MFG. CO.
MACOMB & BEAUBIAN STS. DETROIT, MICH.
FORMERLY WHEELER MANUFACTURING COMPANY
WE MANUFACTURE
TOPS
FOR ANY MAKE OF CAR
CAPE
STORM FRONTS
FACTORY CAPACITY
5000 TOPS PER ANNUM
OUR PATENTED EXTENSION TOPS SEMI-LIMOUSINE AND CANOPY TOPS WITH CONCEALED BODY IRONS ARE HIGH CLASS
EXTENSION TOP WITH EITHER SLAT IRON OR SOCKET CONSTRUCTION ALSO JOINTS IF DESIRED

**We also make a full line of Wood Wind Shields**

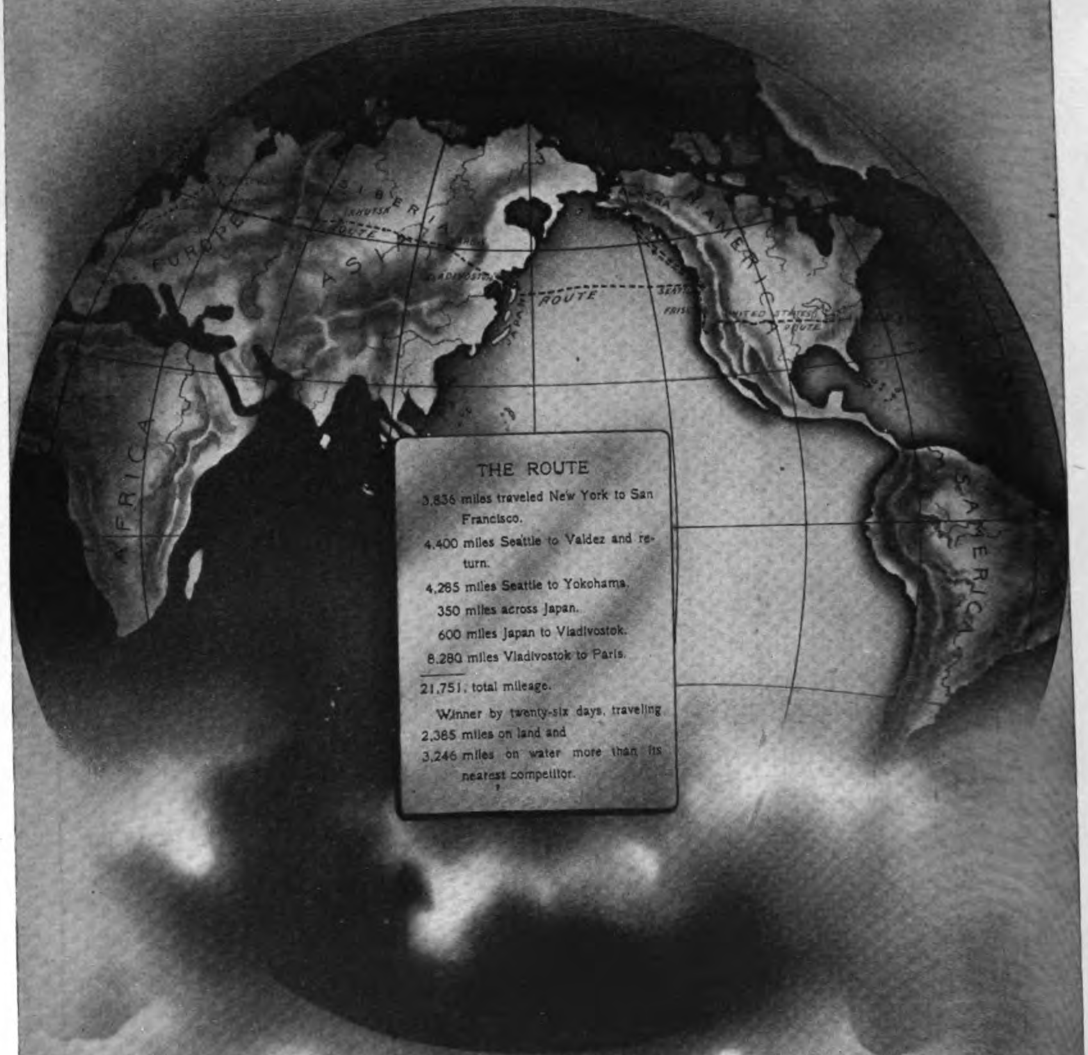
**Our facilities for Tops in Quantity are unequaled**

## ASK FOR SPECIAL JANUARY CATALOG

**See us at the following Shows:**
**New York Grand Central Palace, Space No. 125**
**" " Madison Square, " " 325**
**Chicago Coliseum, . . . " " 10**

## RANDS MANUFACTURING CO., Detroit, Mich.

## THE ROUTE OF
# THE THOMAS FLYER
## NEW YORK—PARIS RACE
22,000 MILES


SIBERIA
ASIA
EUROPE
AFRICA
IRKUTSK
ROUTE
VLADIVOSTOK
JAPAN
ROUTE
SEATTLE
FRISCO
UNITED STATES
ROUTE
N. AMERICA
S. AMERICA

THE ROUTE

3,836 miles traveled New York to San Francisco.

4,400 miles Seattle to Valdez and return.

4,265 miles Seattle to Yokohama.

350 miles across Japan.

600 miles Japan to Vladivostok.

8,280 miles Vladivostok to Paris.

21,751, total mileage.

Winner by twenty-six days, traveling 2,385 miles on land and 3,246 miles on water more than its nearest competitor.

THE THOMAS LINE

| | |
|---|---|
| Thomas 6-cyl. 40 h p. Flyer, | $3,000 |
| Thomas 4-cyl. 60 h.p Flyer, | 4,500 |
| Thomas 6-cyl. 70 h.p. Flyer, | 6,000 |

Limousines, Landaulets,
Broughams, Touring Cars

Send 25c. in stamps for complete illustrated story of New York-Paris Race

**E. R. THOMAS MOTOR COMPANY, BUFFALO, N. Y.**

THE ONE BEST PLACE

NEW YORK
SPORTING
GOODS
Co
17 WARREN ST. NEW YORK
MADE IN U.S.A.

## 1909
## CATALOGUE No 42

# AUTOMOBILE ACCESSORIES

## *MOTOR CYCLE SUPPLIES*

Our 1909 catalogue of Automobile Accessories is the most complete book of its kind ever issued. It contains over one hundred pages, illustrating and describing Supplies of real merit with all experiment left out.

**IT FITS THE POCKET AND THE PRICES FIT THE POCKET BOOK**

The size, 5 x 7 inches, slips in your pocket conveniently, and the prices are as low as is consistent with good quality. We want your orders by mail with the understanding that the goods are ours and the money yours until you are satisfied. Send for this book and do business with a house that has a record of twelve years of square dealing. If you are a dealer, please write on your printed letter head or enclose your business card.

# NEW YORK SPORTING GOODS Co.

"NEAR ENOUGH TO BROADWAY FOR CONVENIENCE - FAR ENOUGH FROM BROADWAY FOR ECONOMY"

**17 WARREN STREET NEW YORK U·S·A·**

# NONPAREIL HORNS

The superiority of NONPAREIL HORNS is acknowledged by Manufacturers, Jobbers, Dealers and Consumers.

The fact that we have closed contracts with 90% of all the Automobile Manufacturers speaks for itself.

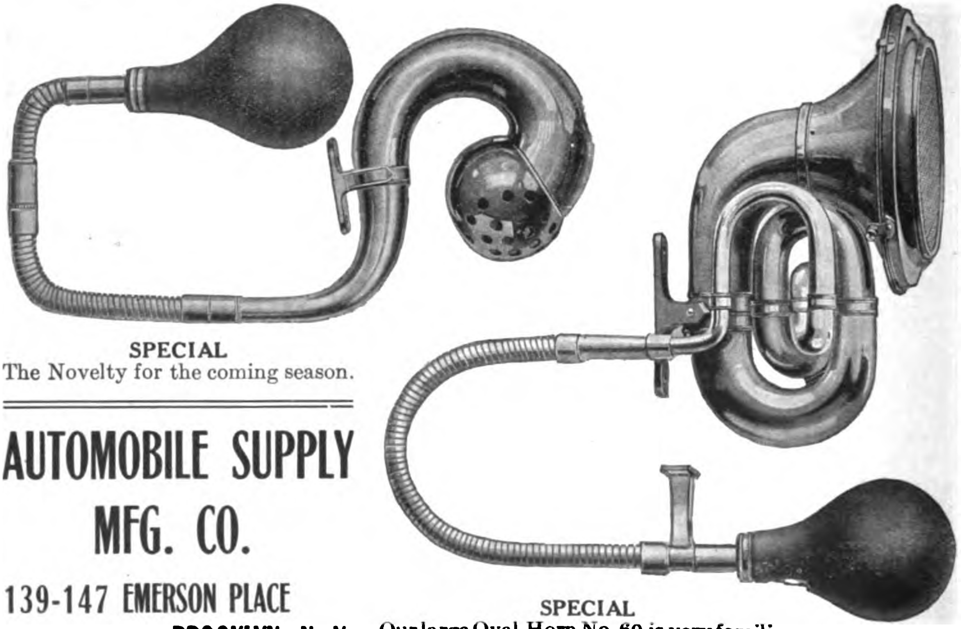
## THIS IS NO EXAGGERATION, BUT THE ABSOLUTE TRUTH

Our statement is also sustained by the fact that we have 35,000 square feet of space, devoted exclusively to the manufacture of Automobile Horns, and we cheerfully extend a hearty invitation to anyone desirous of inspecting our three plants, which are located at

**Nos. 139-147 Emerson Place**
**Nos. 120-124 Taaffe Place** } **BROOKLYN, N. Y.**
**Nos. 218-220 Classon Ave.**

where they can see our 246 men at work.

We have added, this year, a new line of Horns, patented, that for **novelty, Compactness** of **Construction, rich, penetrating tone,** and **reasonable prices,** are attracting the attention of the trade in general, and are bringing in enough orders to keep us busy with our full force, up to August 1, 1909.



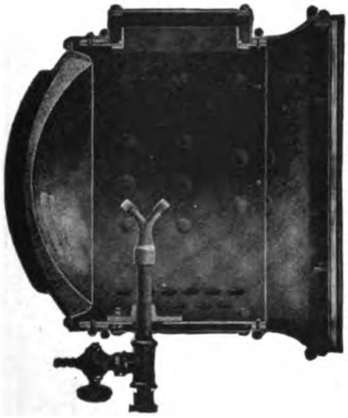
SPECIAL
The Novelty for the coming season.

SPECIAL
Our large Oval Horn No. 60 is very familiar
to the makers of high-class cars

**AUTOMOBILE SUPPLY**
**MFG. CO.**

139-147 EMERSON PLACE
**BROOKLYN, N. Y.**

# The Man Who Specifies Rushmores



does so because he wants the REAL THING; the real thing in SERVICE, which only big, short-focus lens mirrors and heavy mechanical construction can give; and the real thing in APPEARANCE—not a tupenny pretense of a lamp hidden behind a big Merry Widow front door.

The man whose car is equipped with Rushmores—Headlights, Searchlight and Generator—drives at night exactly as by day, with equal safety and pleasure, and at equal speed. HE gets the full value that his car ought to give.

## Rushmore Dynamo Works

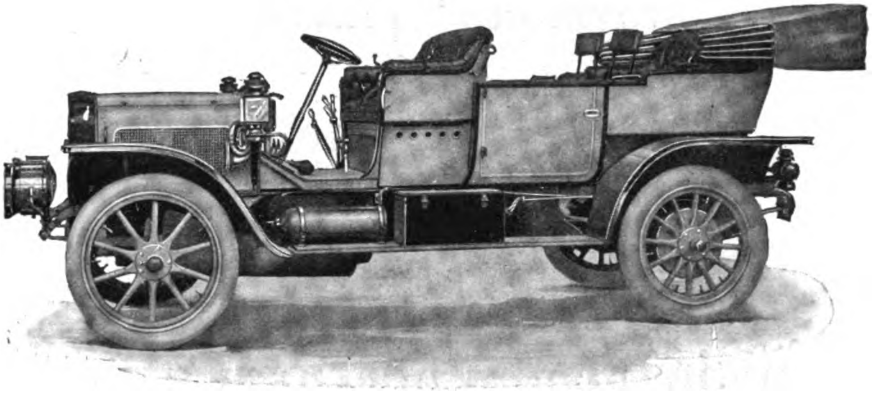
**Plainfield, New Jersey, U. S. A.**

**LONDON PARIS CHICAGO**

This is the type of Cooler that helped "The Buick" come in ahead of all American competitors in the small car race at Savannah, Ga. We are building 20,000 Coolers for 1909 and have ample facilities for more. We repair any make of Radiator on short notice at reasonable charge.

**ROME-TURNEY RADIATOR CO., Rome, N. Y.**

# THE MODEL "M" WHITE STEAMER is the Most Luxurious Car on the Market



The luxury of the White Steamer is unequalled by any other machine. There is no car, however expensive, which has better upholstery, better springs or better finish. Owing to the compactness of the mechanism, the body is much more commodious than in any car of similar wheel-base (122 inches). Few other makes have such a liberal tire equipment (36 x 4 on the front wheels and 36 x 5 on the rear wheels).

The luxury of any car, however, depends largely upon its riding qualities, and here, the White is "in a class by itself" It is the only car where starting and changes of speed can be effected without jerks or jolts. It is the only car which runs noiselessly under all conditions. It is the only car which is free from vibration, because it is the only car where the power is applied evenly and continuously, and not spasmodically.

Just as our Model "M," priced at $4,000 is the most desirable of the higher priced cars, so our Model "O," at $2,000, predominates among moderate priced machines.

**Write for Descriptive Matter**

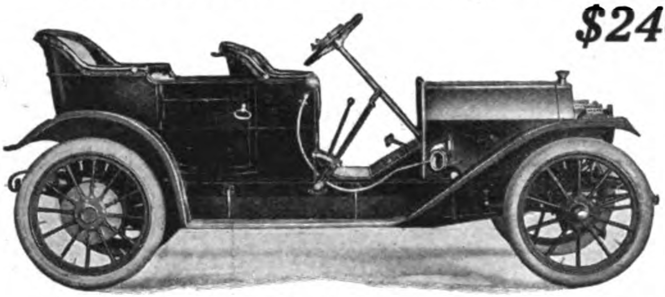
# THE WHITE COMPANY

## CLEVELAND, OHIO

**New York City, Broadway at 62d St.**
**Boston, 320 Newbury St.**
**Philadelphia, 629-33 N. Broad St.**
**Pittsburg, 138-148 Beatty St.**
**Cleveland, 407 Rockwell Ave.**
**Chicago, 240 Michigan Ave.**
**San Francisco, Market St. at Van Ness Ave.**
**Atlanta, 120-122 Marietta St.**

THE MARMON
"A Mechanical Masterpiece"

*Marmon "Thirty-Two,"*
***$2400***



For the Man Who Doesn't Buy with His Eyes Shut

The Marmon "Thirty-two" is neither a cheaply-built car at a low price, nor a "good-enough" car at a high price.

It is a thoroughly high-grade car, carefully built and completely equipped, at a price which makes it the best real bargain of the day.

It is a car of whose character, appearance and performance its owner may well be proud. It is a car that can be depended upon to give long and economical service.

It represents the highest class of motor car engineering. It is thoroughly rational in power, weight and carrying capacity and consistent in price.

Equipment and Marmon construction considered, it urges a careful investigation by every buyer who is really economical.

Genuine Krupp and Chrome Nickel Steels used in important parts. Bosch magneto and battery—dual system. Hess-Bright imported ball bearings. Large brakes. Marmon oiling system. Straight line shaft drive. Transmission and rear axle in one unit. Three-point motor support. Weight (weigh it), 2100 lbs. 32-40 H. P. Big Tires (34x4 all around). Fully equipped. Touring Car, Roadster, Four-Passenger Suburban with removable rear seat, Coupe, or Limousine Town Car.

**TO DEALERS: This car is a winner. Your competitors will have to take off their hats to it. See it at the Shows.**

Nordyke & Marmon Co. (Estab. 1851) Indianapolis, Ind.

*Standard Mfgrs. A. M. C. M. A.*

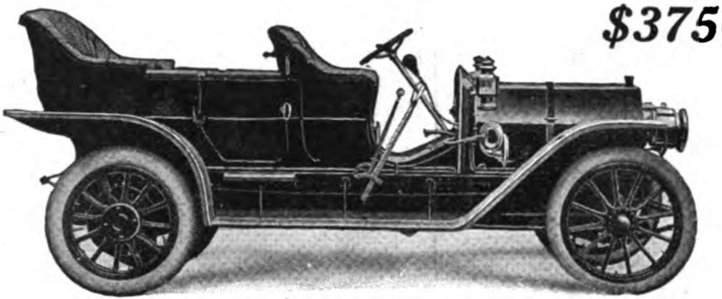
**On exhibition at Grand Central Palace Show, New York, first week of January. Will also exhibit at Chicago Show in February.**

The Easiest Riding Car In The World

# THE MARMON

"A Mechanical Masterpiece"

## *Marmon "Fifty"*
## *$3750*



# A Superb Car, of Pre-eminent Mechanical Excellence

The distinguished appearance, masterful design and thorough excellence of the Marmon "Fifty" give it unusual attraction to that class of purchasers who desire not only a large and powerful car, not only a car of known prestige, but also a car that is beyond reproach in character of construction and practical mechanical merit.

A reading of the specifications will at once inform the experienced motorist that he gets in this model all—and more—than he obtains in the most famous foreign cars sold at two or three times the price, and more than he gets in any other American car at any price.

Furnished with Seven-passenger Body. 50-60 H. P. Bosch magneto and battery. Price, with complete equipment, $3750.

## Marmon "Forty-five" Roadster, $3500

This model possesses all the high character of the Marmon "Fifty," with a little shorter wheelbase, a slightly smaller engine, and a few other details necessary to make the roadster a distinctive type. It offers a combination of high speed with unusually easy riding qualities. The price includes full equipment.

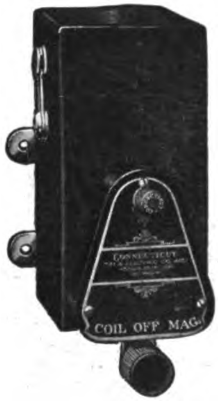
Nordyke & Marmon Co. (Estab. 1851) Indianapolis, Ind.

*Standard Mfgrs. A. M. C. M. A.*

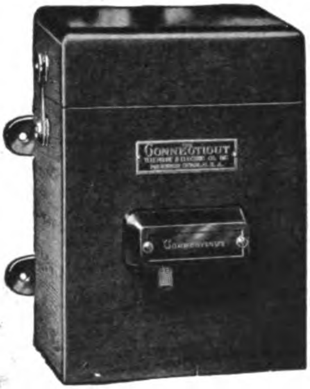
**On exhibition at Grand Central Palace Show, New York, first week of January. Will also exhibit at Chicago Show in February.**

The Easiest Riding Car In The World

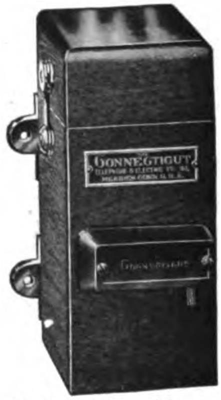
# CONNECTICUT



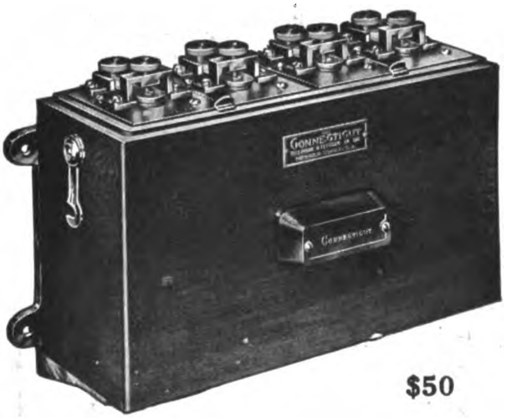
**One Cylinder Type A Dash Magneto Switch**
**$15**



**Two Cylinder Type A Dash Coil**
**$25**

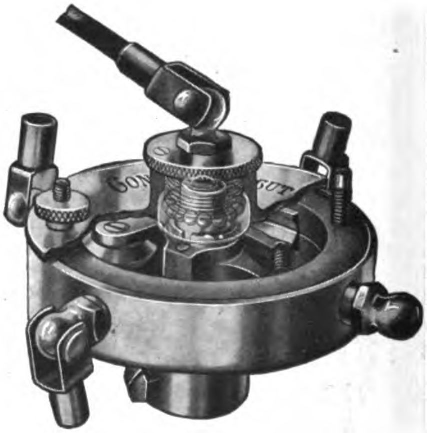


**One Cylinder Type A Dash Coil**
**$13.50**

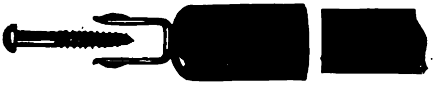


**$50**

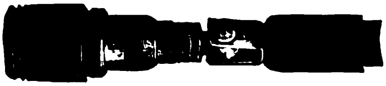
**Four Cylinder Type A Dash Coil**
**Cover Removed**



**4 Cylinder Timer, $8.50**
**6 " 9.50**



**Secondary Terminal Disassembled**
**Secondary, 20 cents each.**



**Secondary Terminal**
**Primary, 15 cents each**

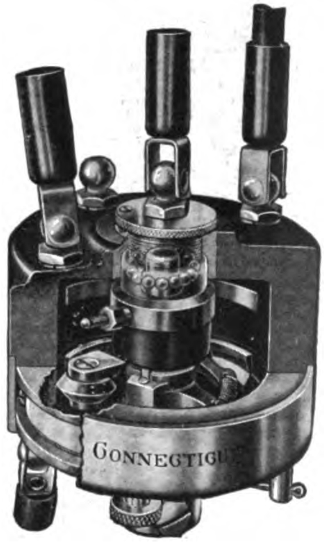
**For Any Size, Write**

## CONNECTICUT TEL. AND ELECTRIC COMPANY, Inc.

**30 BRITANNIA ST. :: MERIDEN, CONN.**

CONNECTICUT

Two Cylinder Special Marine Box Coil, $ 18
Single Cylinder - - - - - - - 9 00


CONNECTICUT

4 Cylinder Distributor, $17
6 " " 18

AMPERES
VOLTS
CONNECTICUT
VOLTS AMPS

Volt-Am Meter
$5.00

One Cylinder Covered
Marine Coil, $ 9.00
With Switch, - 10.00

AMPERES
CONNECTICUT

Coil Current Indicator
With Plug - $5.50
Without Plug, 5.00

CONNECTICUT TEL. AND ELECTRIC COMPANY, Ind.
30 BRITANNIA ST. :: MERIDEN, CONN.

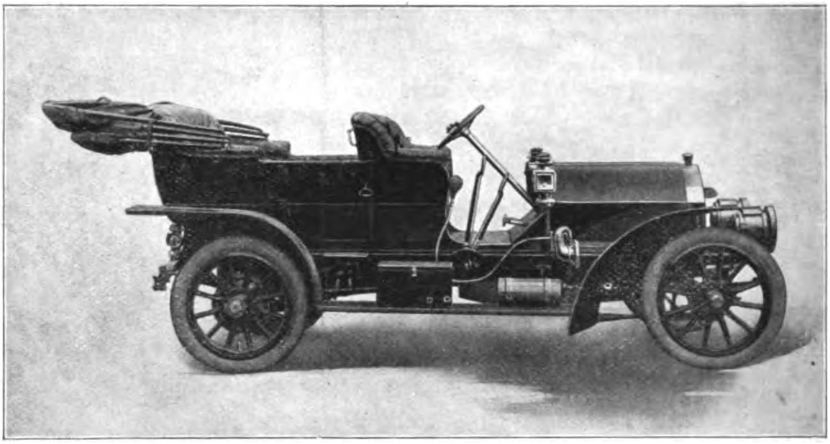
# PENNSYLVANIA

## 1909

**The great type "C" Pennsylvania "50" remains unchanged**

# NOW AND FOREVER

The new 1909 group of the Pennsylvania "50's" will be practically the same as before. We carefully and faithfully recorded the few suggestions made by agents and owners, based upon thousands of miles of service and found nothing worthy of adoption.



TYPE "C." BABY TONNEAU AND TOURING CAR, $3,000

## MODELS FOR 1909

| | |
|---|---|
| Type "D 25" runabout, $2000. Baby Tonneau and Touring car, | $2100 |
| Type "E 50" Seven passenger touring car, luxurious Quinby appointment, | $3800 |
| Type "F Six," develops 75 H. P., fitted only with Baby Tonneau, | $4500 |

"Quinby" equipment can be furnished on any of the above types, in any style, at an additional price.

All models equipped with double ignition and gas tanks.

**J. M. Quinby & Co., of Newark, N. J., distributors in New York City and New Jersey**

**Grant Square Auto Co., of Brooklyn, Brooklyn and Long Island distributors**

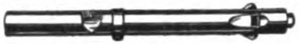
## PENNSYLVANIA AUTO MOTOR CO.
## BRYN MAWR, PA.

# GABRIEL 1909

GABRIEL
TRADE MARK
GABRIEL HORN MFG. CO.
CLEVELAND
PATENTED OCT. 24.05.
& OTHER PATENTS PENDING

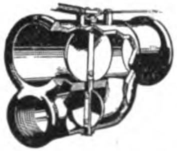
IN order to maintain the high standard which the products of our factory have acquired, many improvements have been made in the 1909 models of The Gabriel Horn, The Gabriel Shock Absorber, and The Gabriel Cut-Out Valve. Gabriel products still set the pace which competing lines try to follow.

## A POLITE REQUEST



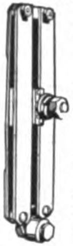
The rich mellow notes of THE GABRIEL HORN act as a polite request, not a harsh demand. It warns without frightening. By a new device its sweet musical three-note tone used for city purposes can be caused to rise in unison for a penetrating warning on country roads. The Gabriel Horn is used exclusively on the personal cars of King Edward of England, Emperor William of Germany, and other crowned heads of Europe.

## 1909 GABRIEL HORN and CUT-OUT VALVE



We have perfected a new valve which is used both for operating exhaust horn and for cut-out purposes. For cut-out purposes, remove the disc in main channel, thereby relieving back pressure from muffler through additional opening of 1½ in. Made to fit exhaust pipes 1 in. to 2½ in. outside diameter. Warranted not to stick under any conditions.

## GOING UP



is pleasant enough, but coming down with a thud is what makes the nerves quiver and cry for

## 1909 GABRIEL SHOCK ABSORBERS

A retarding friction gradually applied in proportion to the shock takes up all jolts and jars, and makes riding over rough roads or bumpy pavements a positive pleasure. The 1909 Model has improvements which give increased bearing surface, eliminate noise or rattle and greatly increase its efficiency and durability. Thermoid used for friction pad. Can be attached to any car or any type of spring.

*Write for booklet illustrating and describing our 1909 Products*

**GABRIEL HORN MFG. CO.**

**1412 E. 40th St., Cleveland, O.**

Buy from a house with
an
established reputation

# TIMES SQUARE AUTOMOBILE COMPANY

1597-1599-1601 BROADWAY New York
1332-1334 MICHIGAN AVE. Chicago Ill.

**NEW & USED CARS** We've over 300 new and used Cars on our floors ready for your inspection. We've no interest in pushing any one make of cars. We buy and sell for spot cash only. We pay no commission to chauffeurs. Our sole mission in life is to buy good, new and used cars and to sell them promptly at a small profit.

Now is the time to buy an automobile cheap. Many people prefer to turn their Automobile into cash at this time of the year in preference to carrying the same over the winter.

In the past weeks we have had many bargains brought to us; some needing the ready cash have sacrificed their car for quick turn. Our Sales Rooms are crowded with many tempting bargains. Do not wait. Times are going to be good, and good second-hand cars will be scarce. So come and buy quickly while you have the chance.

Among the many bargains are such cars as Packard, Pierce-Arrow, Lozier, Columbia, Peerless, Pope-Hartford, Oldsmobile, Winton, Buick, Cadillac, White, Knox, Queen, Waltham, Stearns Thomas, Hotchkiss, Locomobile, C. G. V., Renault, Rochet, Schneider, Fiat, Ford, Baker Electric, Pope-Toledo, National, Wayne, Royal Tourist, Columbia, Panhard, Mitchell, Dragon, Maxwell, Woods, Dolson, Aerocar and many others too numerous to mention. Send for **"The Times Square Automobile Bulletin"**, our cut-rate bargain list.

**$150 UP**

**AUTO SUPPLIES, TIRES, TUBES** We absolutely guarantee each and every article to be genuine and first class as well as the latest product of the various manufacturers, or money refunded without a question or quibble. We do not claim to conduct our business in a philanthropic manner or sell goods at cost or below cost; but we do claim to be satisfied with a legitimate living profit. Our cut prices are real reductions and actually save from 20 to 50 per cent. on your yearly purchases. Our prices are within the limit of legitimate profit of any commercial enterprise. You will find the same article the same brand and the same make as sold by other houses at the regular list price invariably quoted by us at a considerably lower price. Our cut prices are based upon the rock bottom cost of manufacture plus a small legitimate profit and quoted regardless of the fictitious list price established by the manufacturers.

**STEPNEY SPARE WHEELS** The only wheel that eliminates your tire troubles and insures yourself and guests against the delays and terrors of road repairs. In case of puncture or blowout, it is merely necessary for the driver to step from his car, snap on the Stepney Spare Wheel, which can be done in less than one minute, and you can at once proceed on your journey. This is the wheel that created such sensations at the Shows in New York, Chicago and St. Louis. On a test run, made under the direction of the officials of the Chicago Motor Club, the Stepney Wheel was kept in active service for 325 miles between Chicago and St. Louis, over the worst roads in America and under the worst winter weather conditions.

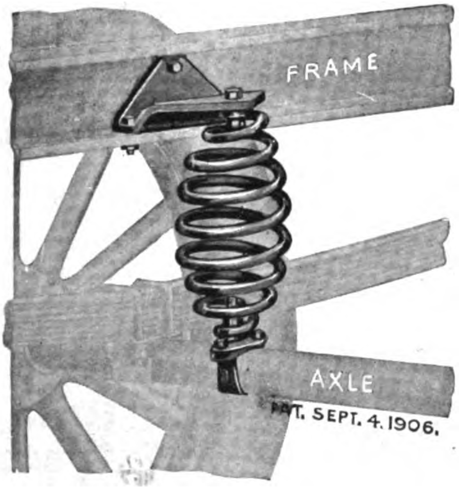
**CUT PRICES**

**$13.50** You know the old story of Finnegan, the railroad section hand—"Off again, On again, Gone again Finnegan"—well, the Stepney Spare Motor Wheel is the Finnegan of Motor life. It's off and on in a minute. A mere novice can slip it on. You go out knowing tire troubles will not delay you. You come home satisfied on time. Regularly sold at $32.50 to $35.00. Our cut rate price is **$13.50.**

**The largest dealers in new and used automobiles in the world**

**Don't pay outrageous prices**

# You've Tried the Rest, Now Buy the Best



**A Few Who Appreciate the Superior Merit of Sager Equalizers**

"We are entirely satisfied with them."
**Elmore Mfg. Co.**

"The 'Sager device' presents advantages not found in other so-called 'shock absorbers.'"
**Olds Motor Works**

"They add greatly to comfort and reliability."
**Crawford Automobile Co.**

"We find them indispensable."
**Logan Construction Co.**

"Our customers are more than satisfied with them."
**Dorris Motor Car Co.**

"Have given us very excellent satisfaction."
**Thomas B. Jeffrey Co. (Rambler)**

"In the last three years we have used quantities of your Springs, which have given excellent satisfaction.
**Dayton Motor Car Co. (Stoddard Dayton)**

"Used your springs with splendid success."
**The Autocar Co.**

"We claim 1908 will be a Sager year."
**Meteor Automobile Co.**

"A great benefit, and we cannot speak too highly of them." **The Forest City Motor Car Co.(Jewel)**

"Give perfect satisfaction."
**Evansville Automobile Co.**
**(Gearless Automobile)**

"We found your springs to be satisfactory."
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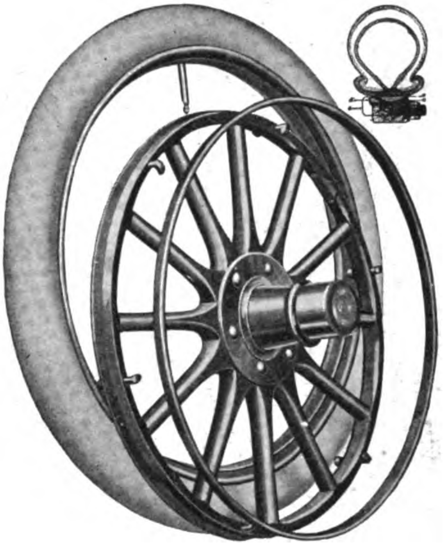


PATENT APPLIED FOR.

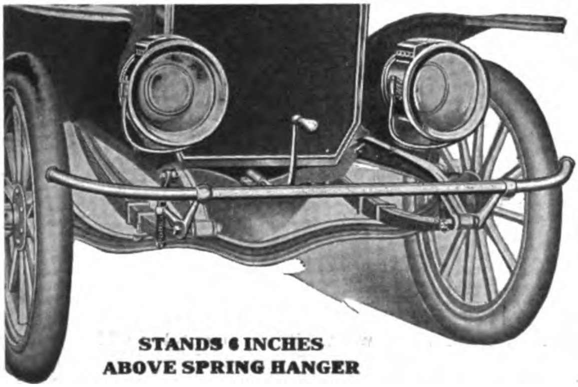
## THE DEMOUNTABLE RIM

you have been waiting for
Detached in 30 seconds.

*See us at the SHOWS, or write us for Particulars*

## PROTECTION BUMPER

Protects Lamps, Radiators and Tires. Easily Attached to Any Car.

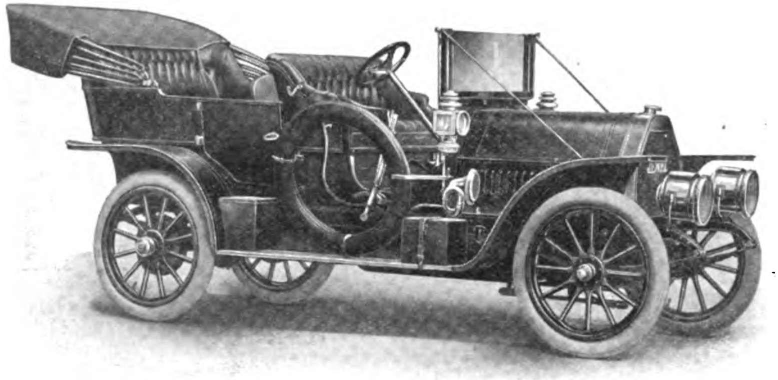


Two Styles —Enameled Black or Brass Covered Steel.

*Write to-day for full particulars.*

## J. H. SAGER CO., 263 South Ave., Rochester, N. Y.

# THE JEWEL



## THE "JEWEL 40"

# THE NON-SKIDDING CAR

## Price, $3,000

The new Jewel is one of the best examples of the high-grade American car. It has long, wide springs; large wheels and tires; radiator on line with the front axle; absolute dust-proofing of the motor, gears and bearings; automatic oiling of the motor and transmission; double brakes on each rear wheel, strong enough to hold under any and all conditions; adjustable roller bearings throughout, which need practically no attention; and many other features which go to make a reliable and serviceable car.

Glance over the following specifications. They will convince you more than words that the "Jewel 40" is the best car to be obtained for the price.

**MOTOR**—The famous Rutenber, 4¾ x 5 inches.

**DOUBLE IGNITION SYSTEM**—Imported, high-tension Bosch magneto and Exide storage battery through Connecticut coil.

**DOUBLE OILING SYSTEM**—Unique, automatic, effective.

**TIMKEN AXLES AND BEARINGS**—36-inch wheels.

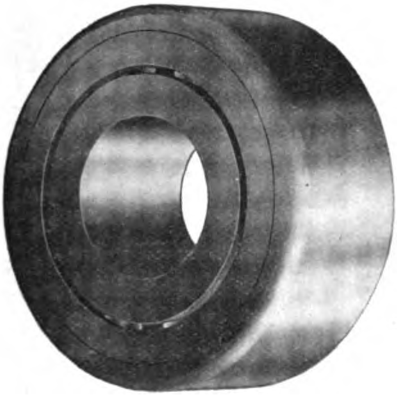
**HEDGELAND NON-SKID DIFFERENTIAL**—36 x 4½-inch **TIRES** front, 36 x 4-inch rear. 120-inch Wheel Base.

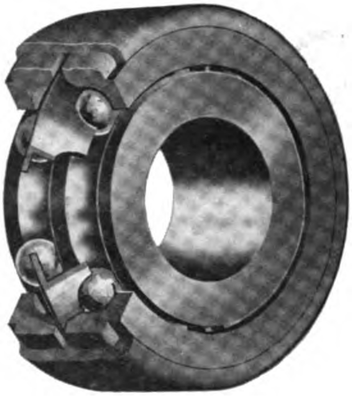
The "Jewel 40" seats seven passengers comfortably. The equipment is exceedingly liberal, and consists of full extension top, folding glass wind shield, Hartford shock absorbers, large Prest-O-Lite gas tank, trunk rack, tire irons, robe rail, foot rest, clock and speedometer; and the price is ONLY $3,000. No extras to buy.

This is surely the car you want. Send for catalog which will give full details.

**The Forest City Motor Car Co.,** 114 Walnut Street
MASSILLON, OHIO

## The only Ball Bearing that is equally effective in taking loads or strains from any angle





## New Departure "Two-in-One" Ball Bearing

**Advantages:—**

**Two qualifications**—radial and thrust, successfully replacing an ordinary radial bearing or an ordinary thrust bearing or any combination of a radial and thrust bearing of the ordinary type.

**Two rows of balls,** giving greater load-carrying capacity, greater durability and longer life.

**Economy** of cost, space, weight and labor.

**Elimination** of vital objections to single row type.

**Non-frictional** ball separator.

There are other advantages, too. Write for catalogue.

**See Exhibit at Shows**

**Grand Central Palace, New York, Space 407, Section J, Second Gallery**
**Madison Square Garden, New York, Space 521, Basement.**

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**The New Departure Mfg. Co.**
**Bristol, Conn.**

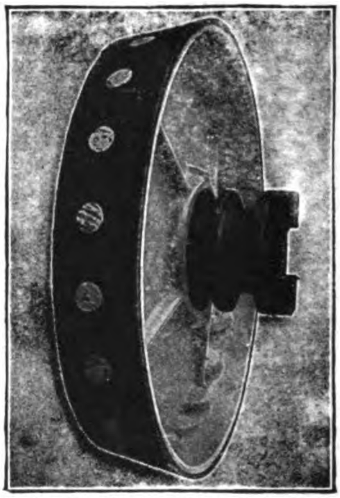
# CORK INSERT

(Patented)

# Clutches

and

# Brakes



Leather-Faced Cone with Cork Inserts
The Geo. N. Pierce Co.

## ARE USED BY

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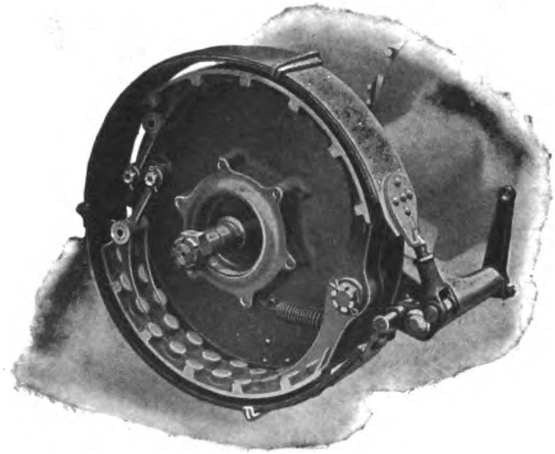

## Oil-Cooled Brake

### Fitted with Cork Inserts

Used for 12,189 miles on Premier Century Car showing practically no wear when examined by the technical committee composed of Messrs. David W. Beecroft and Berne Nadall.

## Manufactured for the Trade by

**Boyer Auto Parts Co., Muncie, Ind.**
Leather Faced Cone with Cork Inserts. Bronze Faced Cone with Cork Inserts.

**The "Long-Arm" System Co., Cleveland, Ohio.**
Leather Faced Cone with Cork Inserts.

**General Mfg. Co., Elkhart, Ind.**
Leather Faced Cone with Cork Inserts.

**Verstraete-Fyfe Mfg. Co., Burlington, Wis.**
Three or Five Plate Disc Clutches and Leather Faced Cone with Cork Inserts.

**Continental Motor Mfg. Co., Muskegon, Mich.**
Three or Five Plate Disc Clutches with Cork Inserts.

**Northway Motor & Mfg. Co., Detroit, Mich.**
Three or Five Plate Disc Clutches and Leather Faced Cone with Cork Inserts.

**Milwaukee Motor Co., Milwaukee, Wis.**
Three or Five Plate Disc Clutches and Leather Faced Cone with Cork Inserts.

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**National Brake & Clutch Co.**
**16 State Street, Boston**

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1 year, $2.00

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The Commercial Agencies

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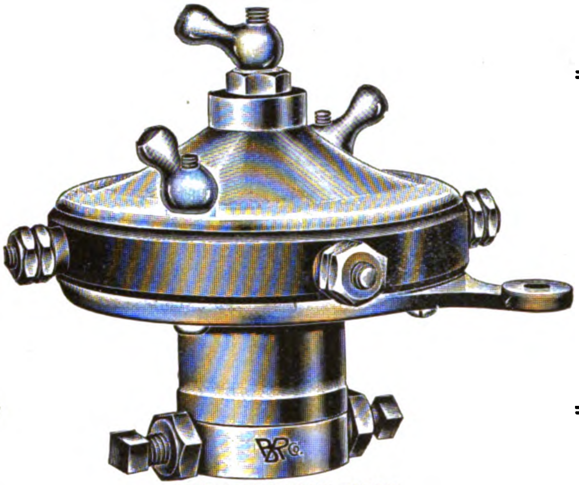
# The MAXIMUS Makes Motors Mote

Over 12,000 satisfied users. If you are not one of them,
you should be; they save your temper, time and money.

PATENTED JUNE 2, 1908

**More Speed**

**More Power**



**Less Plug Trouble**

**Less Coil Trouble**

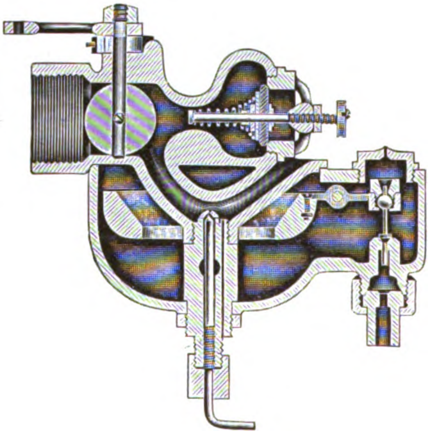
THE "MAXIMUS" TIMER

**We know** we have the best timer made, and that it will improve the speed, power and smooth-running qualities of your motor; if it does not, your money will be refunded without argument. 85 per cent. of 1908 model machines are equipped with roller type timers. The Maximus is constructed on the principle of the best of these, but has several improved features that overcome the weak points of roller-type timers, and make the motor mote. A special Maximus, designed to be easily applied to 2-cylinder Buick and Models M and N Ford is now ready for delivery.

The unprecedented success of the Maximus Timer encouraged us to experiment in carburetion, and, after careful testing and improving, we are now ready to offer

## The MAXIMUS CARBURETOR

**Simplified Carburetion**



**List Price**

**1-inch Size, $11.00**

**1¼-inch Size, $12.00**

The principal feature is the improved method of applying both the constant and compensating air. The small opening for the constant air creates a strong vacuum on the nozzle, resulting in throttling to very slow speed and ease in starting. The method of applying the compensating air does away with the sudden increased rush of air on the spray nozzle at change of throttle.

MADE BY

**The BECKLEY RALSTON CO., 80-82-84 Michigan Avenue, CHICAGO, ILL.**

**Don't be**
**"easy"**
**and pay a**
**large price**
**for what**
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**a high grade**
**TOP or**
**SLIP COVER**
**and allow**
**the maker to**
**furnish an**
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**material to**
**increase**
**his profits.**

**SPECIFY**
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**Pantasote**

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**of recog-**
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**superiority,**
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**of, and the**
**protection**
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SPEEDOMETER-MILEAGE RECORDER
STEWART & CLARK MFG. CO.
CHICAGO U.S.A.

ON THE JOB

# Dealers Who Sell

# STEWART SPEEDOMETERS

# Have a Cinch

As one big dealer says, if you sell Stewart Speedometers it means

**No speedometer troubles. No customers constantly coming in with broken shafts. No returned speedometers. No dissatisfied customers. Five times the volume of business.**

and it's a heap easier to hand him a five-year guaranteed Stewart Speedometer, at a reasonable price, than to spend an hour trying to convince him that he should pay three times as much for some other make, not nearly so good, and if you did sell him feel that you had stung one of your good customers.

## Me for the Stewart

Our new catalog describing new 1909 line is now ready

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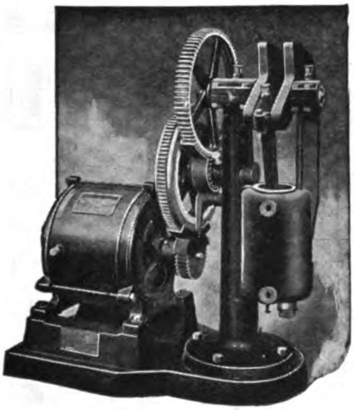
**Stewart & Clark Mfg. Company**

**Diversey Boulevard, Chicago, U. S. A.**

# AIR COMPRESSORS



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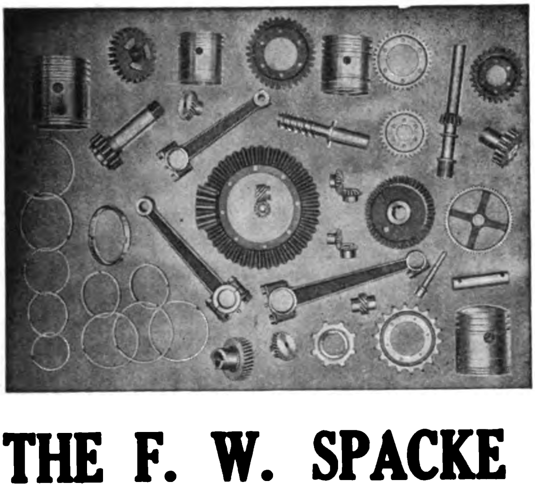
Single and Three Cylinder Styles.

All modern garages use them for inflating tires, cleaning cushions, etc.

A compressor designed for hard and continuous service.

**Finished Die-Cast Bearing Bushings** made to specification.

Let us submit estimates based on your specifications and blue prints.



Let us make your automobile and motor machine parts, like those shown in the cut.

We can make them better and cheaper, and give you prompt deliveries.

**Generated Gears** of every description.

## THE F. W. SPACKE MACHINE CO.

INDIANAPOLIS, IND., U. S. A.

# AUTOMOBILE PARTS

# See The
# At New York
# Automobile

The Remy 1909 High Tension Magneto will be exhibited at the Automobile Shows of the A. M. C. M. A., Grand Central Palace, New York, Dec. 31-Jan. 7; the A. L. A. M., Madison Square Garden, Jan. 16-23; the Chicago Show, Feb. 6–13. See it! ¶ The Remy is the American Magneto, built to give a certain positive firing on the worst American roads and under the hardest conditions.

# Over 17,000 Remys
## More Than All

More Remy Magnetos have already been sold for 1909 cars than all our competitors combined can sell.

What does this mean? Simply that automobile manufacturers who are continually striving to build better cars than their competitors have a reason for adopting the Remy Magneto.

Its absence of adjustments, sensitive parts and complicated wiring appeal both to the user, who does not like the mystery common to electrical apparatus, and the manufacturer who is after "results."

Many victories of 1908 have been won with the help of the Remy. It is used on the Buick which led all American cars at Savannah; on the Buick which captured eight out of nine events at Montreal, besting Christy's and Barney Oldfield's machine and tying for the fastest half mile. It is used on the first and second cars in the Nassau Sweepstakes, Long Island; the Buicks that cleaned up at Indianapolis and at Lowell, Mass.; the Camerons that broke the Record at the Dead Horse Hill Climb, Worcester, Mass., and won the Hill Climbing and Economy Contests at Baltimore; the Knoxs that won at Norristown, Pa., West Haven, Conn., and Rockville, Conn.; the Buick winning first place among all American light cars at Savannah.

**These Manufacturers are Regular Users of the Remy, and more Remys are Being Specified Every Day for the Cars of other makers:**

Buick Motor Co.
Maxwell-Briscoe Motor Co.
Apperson Bros. Automobile Co.
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Pope Motor Car Co.
Regal Motor Car Co.
Olds Motor Works
Crawford Automobile Co.
Overland Automobile Co.
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Kissel Motor Car Co.
Model Automobile Co.
Buckeye Manufacturing Co.

Write us for illustration and full description of our new high tension Magneto. We also furnish fittings for attaching our 1909 high tension Magneto to many of the leading cars. We build Magnetos in such large quantities that we can make you very attractive prices.

**ADDRESS DEPARTMENT 13**

# REMY ELECTRIC CO.

# Remy Magneto And Chicago Shows

The Remy 1909 High Tension magneto can be installed in any standard automobile without difficulty. The diagram makes the installation as simple as A B C. We furnish fittings for many of the leading automobiles.

The Remy provides for a double system of ignition with one set of spark plugs. The Magneto switch furnished with the Magneto is fitted with a push button for starting the motor upon the spark without cranking, where dry batteries are wired in connection with the Magneto.

Satisfactory results are assured with it, whether the user of the car be an experienced mechanician or knows nothing about this Magneto.

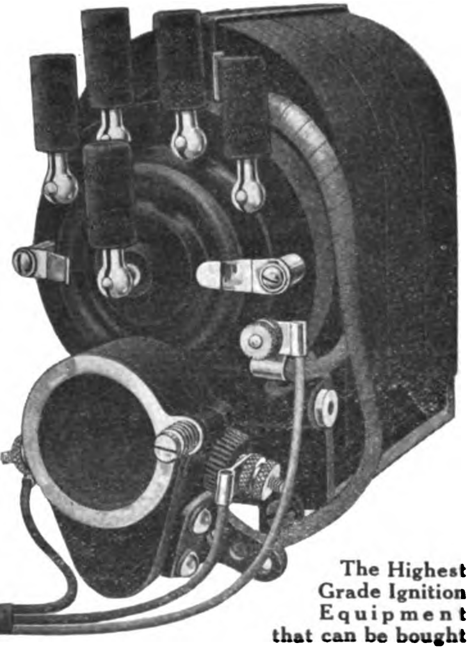
On account of the extra hot spark furnished by this Magneto and the perfect timing of the gear-driven Magneto, from 5 to 25 per cent. more power is secured than where a vibrator coil and storage batteries are used.

# Sold For 1909 Cars Others Combined

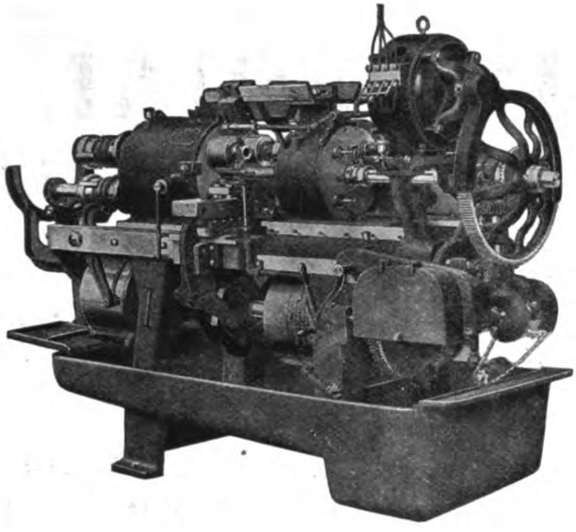
The 1909 Remy High Tension Magneto has a stationary winding, doing away entirely with brushes. Its rotary inductor, taking the place of the ordinarily delicately constructed armature, is a solid steel shaft with two forgings mounted upon it. It cannot fail to operate properly and will stand more abuse than any other part of the automobile. Thousands of these magnetos are in use with perfect results. Never before has there been so universal a demand for one ignition system We are increasing this demand constantly by our big advertising campaign to automobile owners and drivers. The Remy is the most extensively advertised Magneto in the country.

## ANDERSON, IND.

We have opened a branch office at Thoroughfare Bldg., **Broadway and 57th Sts., New York.**



**The Highest Grade Ignition Equipment that can be bought**



**A
ONE
BELT
DRIVE
MACHINE**

**A
SINGLE
MOTOR
DRIVE
MACHINE**

# No. 56
# ACME AUTOMATIC SCREW MACHINE

THE new drive—either belt or motor—is second only to the introduction of Multiple Spindles in its effect on the making of Duplicate parts from Metal Bars.

¶ It makes the machine easier to operate and maintain; faster, more powerful, more productive, more economical—safer and quieter.

¶ With motor drive it has all the advantages of the highest grade electrically driven tools.

*Details on Request*

## THE NATIONAL-ACME MFG. CO.
## CLEVELAND, OHIO

**BRANCH OFFICES:** New York, Boston, Chicago, Atlanta
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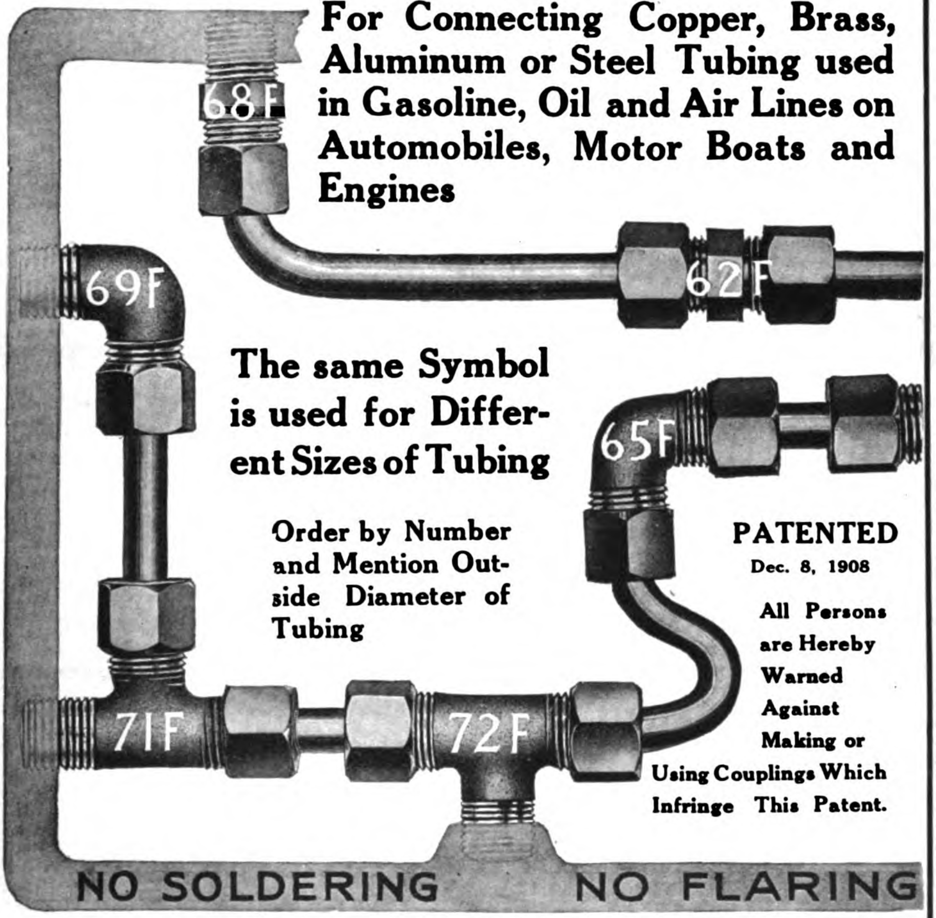
**GEN. FGN. REP.,** Alfred H. Schütte, Schuchardt & Schütte

# IMPERIAL
## COMPRESSION COUPLINGS



**For Connecting Copper, Brass, Aluminum or Steel Tubing used in Gasoline, Oil and Air Lines on Automobiles, Motor Boats and Engines**

**The same Symbol is used for Different Sizes of Tubing**

**Order by Number and Mention Outside Diameter of Tubing**

**PATENTED**
**Dec. 8, 1908**

**All Persons are Hereby Warned Against Making or Using Couplings Which Infringe This Patent.**

## 1909 CATALOGUE READY

**Air Pumps, Water Pumps Oil Pumps, Priming Cups, Gasoline Valves and Cocks, Pipe Fittings, Robe Rails, Handles, Regulators**

**HIGH GRADE BRASS WORK FOR ALL PURPOSES**

# IMPERIAL
## BRASS MFG. CO.

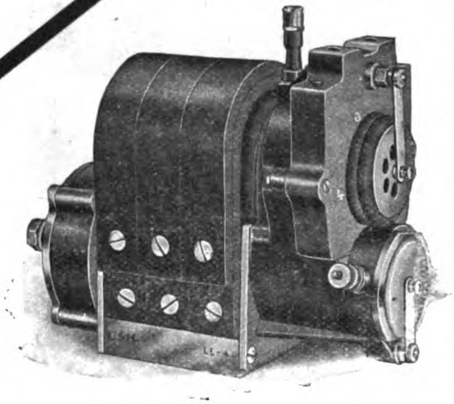
242 So. Jefferson St. Chicago

**LET US MAKE YOUR BRASS WORK**

U&H

MAGNETOS

# A Magneto is Not Complete



if it produces no current till it—and the engine with it—is "spun" by vigorous effort at the starting crank. Many men are physically unable to "spin" a large engine: no one likes it.

Spinning the engine to start the magneto is like pushing the whole car to start the engine.

## In the UNTERBERG & HELMLE SELF STARTING MAGNETO

(Type LE)

the magneto armature receives a quick rotation, no matter how slowly the starting crank is turned. The spark is of racing intensity, and will fire anything that can be called a mixture. And it is automatically retarded past the center, regardless of where the spark advance lever may be. A back kick is impossible.

| | |
|---|---|
| **Type LE—THE SELF-STARTING MAGNETO** | **Price $150** |
| **Type LB, without the starting device** | **Price $125** |
| **Type CB, for 4-Cylinder motors up to 30 h. p.** | **Price $100** |

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**J. S. BRETZ COMPANY**

Sole Importers ~ TIMES BUILDING. NEW YORK

# F. & S.

# ANNULAR BALL BEARINGS

**Efficiency in ball bearings carried to its highest point**

Fichtel & Sachs annular ball bearings are designed to carry out in practice the principle that a correctly built ball bearing distributes the load between all the balls in a position to receive it.

Heretofore commercial limitations of accuracy have led to ball bearings being so designed that only one or two balls would be loaded at any instant.

**F & S** ANNULAR BALL BEARINGS

have their races entirely filled with balls—less only one ball for the separator. The construction by which this is accomplished gives the balls a continuous unbroken path.

For equal loads F. & S. bearings are the most durable in the world.

**J. S. BRETZ COMPANY**

Sole Importers, TIMES BUILDING, NEW YORK

ALLYNE

ALUMINUM — BRASS
AND
BRONZE CASTINGS

AWARDED GOLD MEDAL ST. LOUIS EXPO 1904

DETROIT

LARGEST PRODUCERS OF ALUMINUM, BRASS and BRONZE

CLEVELAND

CASTINGS IN THE WORLD

BUFFALO

ANOTHER POINT FOR YOUR CONSIDERATION

Granting the unquestionable quality of all Allyne Aluminum, Brass and Bronze Castings, the next point for your consideration is SERVICE.

The three Allyne factories employing upward of 600 men and located in Cleveland, O., Buffalo, N. Y., and Detroit, Mich., are so situated and equipped as to execute and deliver all work on schedule time and our motto has always been "A little sooner than promised." Keep this fact in mind.

THE ALLYNE BRASS FOUNDRY CO.
CLEVELAND BUFFALO DETROIT

# Locomobile

**RELIABILITY** **DURABILITY**

## Winner of Vanderbilt Cup Race

## Winner of Philadelphia Stock Chassis Race

### LOCOMOBILE DEALERS:

Albany, N. Y., Taylor Automobile Co.
Amsterdam, N. Y., William Daye.
Baltimore, Md., Callahan, Atkinson & Co.
Bath, Me., H. Washburn.
Birmingham, Ala., C. C. Nixon.
Bristol, Conn., J. B. Sessions.
Brooklyn, N. Y., I. S. Remson Mfg. Co.
Cincinnati, O., Hanauer Automobile Co.
Danville, Ill., Robert Holmes & Bros.
Denver, Colo., Chicago Auto Co.
Des Moines, Iowa, Iowa Auto & Supply Co.
Elkhart, Ind., G. B. Pratt.
Englewood, N. J., Stillman & Hoag.
Essex, Conn., O. N. Beebe.
Grand Rapids, Mich., Dudley E. Waters.
Greenwich, Conn., Allen-Asten & Co.
Harrisburg, Pa., Central Penn Auto Co.
Havana, Cuba, J. M. Duenas Motor Car Co.
Houston, Texas, Mosehart & Keller Auto Co.
Kansas City, Mo., Demster Machinery Co.
Kingston, N. Y., Maurice Deyo.
Lexington, Mass., Fred W. Allton.
Los Angeles, Cal., Los Angeles Motor Car Co.
Lowell Mass., Paschal Sprague.
Marlboro, Mass., Frank Billings.
Mexico City, Mex., Compania Mexicana de Vehiculos Electricos.
Milwaukee, Wis., Schreiber Motor Car Co.
New Bedford, Mass., S. C. Lowe Supply Co.
New Britain, Conn., E. A. Cryne.
New Haven, Conn., Automobile & Supply Corp.
New Orleans, La., The Automobile Co.
Newark, N. J., Greene Motor Car Co.
Norwalk, Conn., F. E. Lockwood & Co.
Ottawa, Ill., W. H. Knowles.
Pittsburg, Pa., Fort Pitt Automobile Co.
Plainfield, N. J., Laing Machine & Repair Co.
Ponce, P. R., Robert Graham.
Portland, Ore., Covey Motor Car Co.
Providence, R. I., Davis Automobile Co.
Reading, Pa., Penn Automobile Co.
Rochester, N. Y., U. S. Automobile Co.
Salt Lake City, Utah, Edwin G. Woolley, Jr.
San Francisco, Cal., Greenland Co., Inc.
Saginaw, Mich., Norris Automobile Co.
St. Joseph, Mo., Wyeth Automobile & Supply Co.
St. Louis, Mo., Capen Motor Car Co.
Seattle, Wash., Marc Bunnell.
Somerville, Mass., Hill & Holt.
Springfield, Mass., Springfield Automobile Co.
Syracuse, N. Y., F. H. Johnson.
Washington, D. C., Leo V. Hysan.
Waterbury Conn., E. H. Towle Co.
Wichita, Kans., A. S. Parks.
Wilkes-Barre, Pa., Wyoming Valley Motor Car Co.
Wheeling, W. Va., House & Becker.

**Some Desirable Territory at Present Unoccupied**

---

## FOR 1909

**"30" Locomobile.** A five passenger shaft drive car developed through **three** years of road work. The name "Locomobile" on a shaft drive car guarantees its superiority. $3500

**"40" Locomobile.** A seven passenger car suited to family use. The logical choice of one who wants a high powered car. $4500.

**The Locomobile Company of America, Bridgeport, Conn.**

**BRANCHES:**

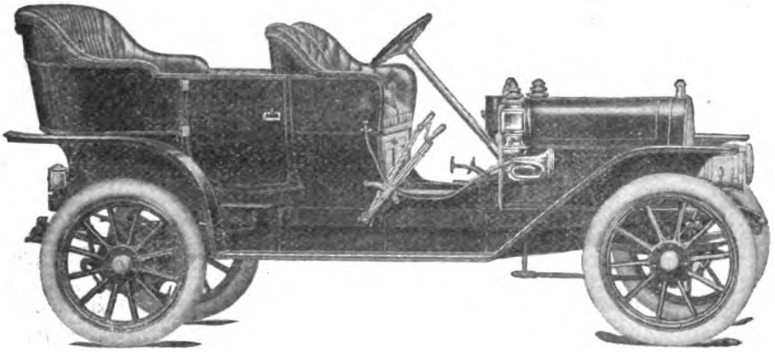
NEW YORK, 76th St., Cor Broadway
CHICAGO, 1354 Michigan Ave.

PHILADELPHIA, 245 N. Broad St.
BOSTON, 589 Boylston St.

*Member A. L. A. M.*

# Some Conditions Which Make Possible

## The Cadillac Thirty at $1,400.00



**Four Cylinder, 30 H. P., Shaft drive, Selective Sliding Gear Transmission, 106" Wheel Base**

95% of all the parts which enter into the construction of the Cadillac "Thirty" are manufactured in the Cadillac plant.

The Cadillac Company maintains its own brass and iron foundries; its own pattern shops; sheet metal shops; machine shops; gear cutting plants; painting, finishing and upholstering departments.

It makes the magnificent motor; and it makes even the little bolts, nuts and cap screws which go into that motor and the car.

It manufactures its own transmissions, its own radiators, its own hoods and its own fenders.

The Cadillac Company operates its own toolmaking department in which are made all the special jigs, tools and dies used in the manufacture of the Cadillac Thirty.

Every one of the millions of pieces made each year passes through the hands of a corps of trained inspectors whose watchword is—precision and perfection.

The expenditure for tool maintenance alone, in the Cadillac plant in a single year is $60,000.

So accurately is every part finished, that thousands of pieces of a kind with thousands of pieces of other kinds, are sent to the various assembling departments and there united without so much as the use of the finest file or emery cloth.

There is no occasion for special "fitting." The limits of measurements in many parts of the Cadillac motor, transmission, etc., are specified to the one-thousandth part of an inch.

More than 500 specially designed automatic labor-saving machines which enable one man to do with greater accuracy the work of four or five or maybe ten, cut a tremendous figure in reducing cost on an output of ten thousand cars.

Two complete and separate mechanical organizations, consisting of 3200 men are working continually, night and day, on this output of ten thousand cars.

It has always been admitted that the Cadillac was the most perfectly standardized car in the world—that its interchangeability of parts was absolute.

Now the plant that achieves perfect standardization likewise produces the most perfect running car, provided, of course, the motor and the other vital parts are competent.

The Cadillac motor bears a reputation without flaw or tarnish. Twenty thousand Cadillac motors are and have been for four, five and six years operating all over the world, and so far as we know not one has ever gone out of commission.

The Cadillac Thirty motor is direct heir to all the virtues of the 20,000 other Cadillac motors which have gone before—the most perfect production of the Cadillac plant up-to-date.

Bearing in mind the output of 10,000 cars and the continuous force of 3200 men and 500 automatic labor-saving machines employed in making them, and the perfect standardization produced by manufacturing all the parts, you will begin to understand why the Cadillac Company is able to build a high-grade car to sell at $1400—a car which in all probability no other plant in the world could build and sell for less than $2,500 to $3,000.

The next step is to see the car (it will exceed your highest expectation in dignity, proportion and richness), to ride in it at any reasonable speed up to 50 miles per hour; to examine carefully the engine and the mechanism and then to put it into active road competition with any higher priced car you may choose.

If you will do this our car is installed.

**CADILLAC MOTOR CAR CO. - - DETROIT, MICH.**

MEMBER A. L. A. M.

**Cadillacs will be exhibited in New York, at Madison Square Garden only, Jan. 16-23 and in Chicago, at the Coliseum.**

K-W K-W K-W K-W K-W K-W K-W K-W K-W K-W K-W K-W K-W K-W

**MODEL C and C M**
for gear or sprocket drive.
**$45.00**
Made for both jump spark and make-and-break. Starts the heaviest engine easily without batteries. Put it in your car and forget you have any ignition.

## Why is
# The K-W Magneto

replacing so many complicated, high-priced, high tension Magnetos of other makes?

## BECAUSE

it will start your engine easily without batteries and run it perfectly at all speeds from the highest to the lowest. It is the simplest Magneto on the market; has no moving wires or brushes, or traps or triggers to wear out or give trouble. The only moving part runs in High Duty Ball Bearings, and with proper attention, which only requires a few drops of oil every hundred miles or so, it will outlast the engine.

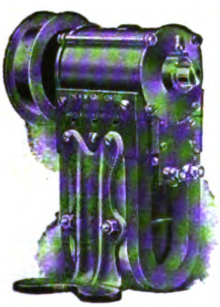
The K-W Magneto used in connection with a K-W Master Vibrator or synchronized coil will give the most reliable Ignition System possible to obtain at any price, with best results.

It will be money in your pocket to investigate to-day.

We also make K-W Coils, K-W Master Vibrators and K-W Plugs.

**Watch for announcement of the K-W Carburetor and the K-W high tension Magneto in next issue.**

**MODEL B**
Friction Drive
**$35.00**
For cars where there is room enough around the flyweeel for friction drive. Will not slip. A standard for good ignition.



**MODEL F**
Belt drive
**$35.00**
Has bracket for attaching to frame of car. Easy to install. Especially for Fords, but good on any car.

# THE K-W IGNITION COMPANY

## 40 Power Ave., Cleveland, Ohio

**New York Representative:**
A. H. GREEN & CO., 1686 Broadway, New York City

**Boston Representative:**
W. J. FORBES, 220 Congress St., Boston, Mass.

**Chicago Representative:**
THE AUTOMOBILE SUPPLY CO., 1339 Michigan Boulevard.

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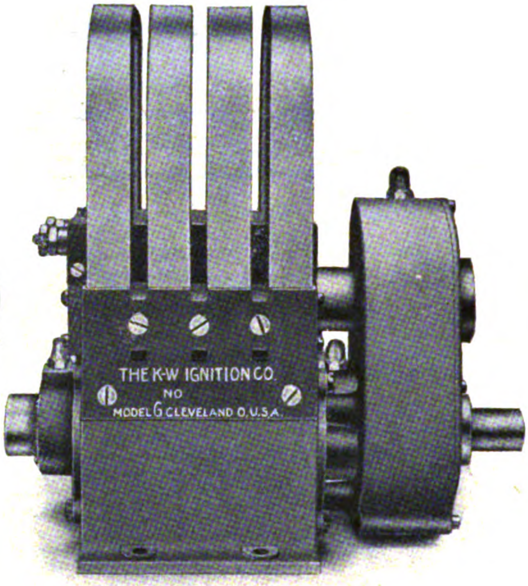
# The New Model G
# K-W MAGNETO



**$50.00** **$50.00**

## GEAR DRIVEN AT ENGINE SPEED

**and works with a vibrating coil and timer.**

## Guaranteed to Start Without Batteries

Get an Ignition System that you can understand, a simple Ignition System that has no complicated traps and triggers to get out of order.

The Model G, K-W Magneto was designed with the sole purpose of replacing the complicated high-priced, high tension magnetos of other makes that go wrong. It has standard base and will fit in place of Magneto you take off or in place provided for Magneto on your motor.

**Read This:**

> Minneapolis, Minn., Dec. 1, 1908.
>
> Gentlemen:
>
> Wish to say that I have a K-W Magneto installed on my —— —— car and there are no words too good to use in connection with this outfit. It is giving perfect satisfaction and in fact giving much better results than it was possible to obtain from a high-priced Magneto which has been installed and taken off from the car in question. Enough said.
>
> Yours very truly,
> S. S. JOHNSON.
>
> We can show thousands like this; it's what they all say.

The Model G is just like all other K-W Magnetos, but has a transmission to run it at the desired rate of speed, when driven at crank shaft speed.

The cheapest ignition system that is good—the best at any price.

## THE K-W IGNITION COMPANY

**40 POWER AVENUE, CLEVELAND, OHIO**

**New York Representative:** A. H. GREEN & CO., 1686 Broadway, New York City
**Boston Representative:** W. J. FORBES, 220 Congress St., Boston, Mass.
**Chicago Representative:** THE AUTOMOBILE SUPPLY CO., 1339 Michigan Boulevard

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# The New
# K-W COIL

K-W
SPARK COIL
THE K-W IGNITION COMPANY
CLEVELAND, OHIO, U.S.A.
K-W
CLEVELAND
BAT OFF MAG

The best coil made for both the K-W Magneto and for batteries because it is made right.

## DO YOU KNOW?

that the average quad coil contains a tablespoon of water after winding. We take all this out by the advanced K-W system of coil building, giving an anhydrous coil and a coil with a quick time constant—A coil you cannot break down.

Has a good fast Hammer Break Vibrator that gives a good fat spark.

The K-W Coil is the best that can be made at any price and the price is extremely low for such a high grade coil. No unfair discounts but true value:—

| | |
|---|---|
| **Plain Box Coils (Marine Coils or Unit Coils)** | **$6.00** |
| **Single Cylinder Mahogany Dash Coil with Switch** | **12.00** |
| **Double " " " " " "** | **18.00** |
| **Three " " " " " "** | **24.00** |
| **Four " " " " " "** | **30.00** |
| **Six " " " " " "** | **42.00** |
| **For Synchronized Coils, add to above** | **10.00** |
| **For Synchronizer or Master Vibrator alone in Mahogany Dash Box and Switch** | **15.00** |

The K-W synchronized coil is like the regular K-W Coil and has an extra unit which contains the synchronizer or Master Vibrator and has a shunting device on the individual vibrators to short circuit them when the Master Vibrator is in use so you can use either the Master Vibrator or the individual vibrators at your will, thus giving two systems in one—either of which is better than you are now using. Its advantages are too numerous to mention here. Write today.

## THE K-W IGNITION COMPANY

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**New York Representative:** A. H GREEN & CO., 1686 Broadway, New York City
**Boston Representative:** W. J. FORBES, 220 Congress St., Boston, Mass.
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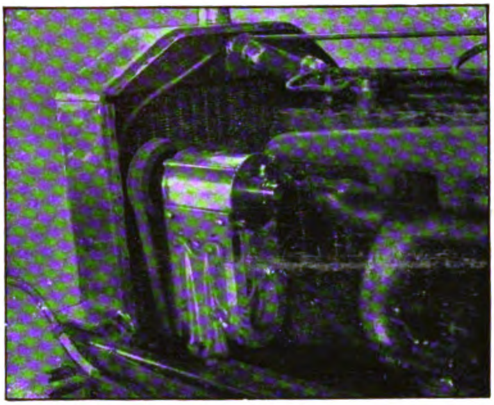
# Get a K-W MAGNETO



## For Your Ford Runabout and Throw Your Batteries Away

This cut shows how easily it can be mounted by simply bolting to the frame of the car.

Install a K-W Magneto and K-W Master Vibrator, and forget that you have any Ignition. Your batteries, if you carry any, will simply remain on your car until they run down of their own accord—batteries are never needed, as the K-W Magneto starts the engine and runs it perfectly at all speeds with more power and more miles per gallon of gasoline. This is the most reliable Ignition System you can install on your car and will give best results. Price, $35.00 for Magneto; $15.00 for Master Vibrator.

## THE CHEAPEST THAT'S GOOD—THE BEST THAT'S MADE

## ANNOUNCEMENT

**THE K-W HIGH TENSION MAGNETO**

will be exhibited at space 223 Madison Square Garden Show, New York, January 16th to 23rd.

**If you want to see the most advanced type of High Tension Magneto,—the best one yet—simple, durable and reliable, look us up at the show.**

Will also be at Boston Show, March 6th to 13th, space 587, and the National Motor Boat Show, New York, February 15th to 23rd.

NOTICE:—**We want live dealers to handle our line in every city. If you can't see us at the show, write us.**

## THE K-W IGNITION COMPANY

**40 POWER AVENUE, CLEVELAND, OHIO**

**New York Representative:** A. H. GREEN & CO., 1686 Broadway, New York City
**Boston Representative:** W. J. FORBES, 220 Congress St., Boston, Mass.
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# Your Factory

## Reproduced in Colors

ON

## HIGH GRADE POST CARDS

BY THE

## Chilton Daylight Process

**Is an Excellent Advertising Proposition**

**NOTHING makes a better "ad" than a picture of your factory printed in actual colors, and looking just as it does when at its best. Many concerns are now using these cards for their traveling men's advance cards, receipt notices, acknowledgement of orders, etc. WE MAKE DELIVERY IN 4 TO 8 WEEKS. State quantities wanted and ask for samples and prices.**

Chilton Printing Company
**PHILADELPHIA**

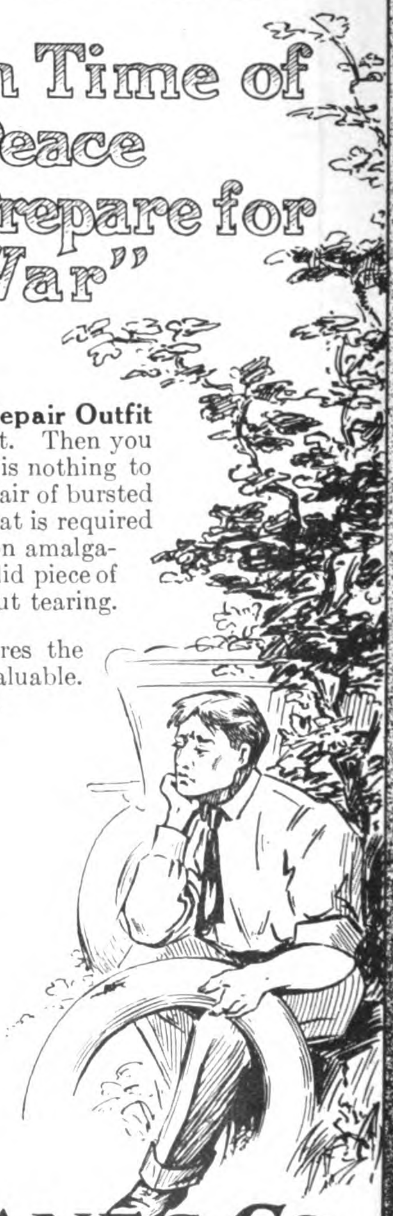
# M&M REPAIR OUTFIT

## "In Time of Peace Prepare for War"

Be sure that the **M. & M. Tire Repair Outfit** always has a place in your Repair Kit. Then you will be prepared for anything. There is nothing to equal it for making a quick, perfect repair of bursted or torn tires and inner casings. No heat is required as the Cement and Acid Cure Solution amalgamates patch and torn parts into one solid piece of rubber that cannot be separated without tearing.

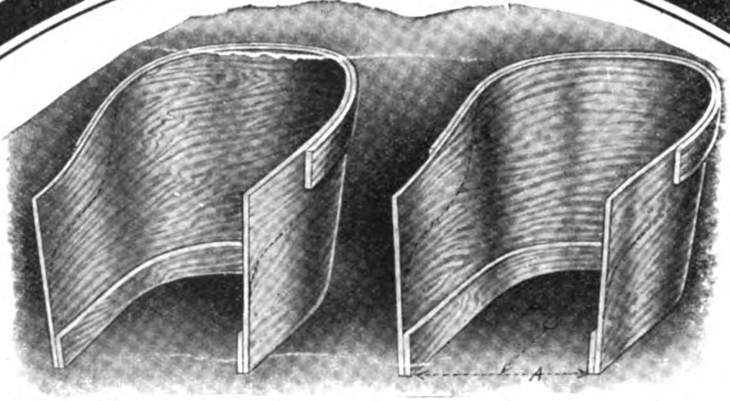
For "first aid" to "injured" tires the **M. & M. Tire Repair Outfit** is invaluable. All dealers and jobbers have it for sale.

DIRECTIONS FOR
M & M CE
ACID CURE SO
VULCANIZING SUBSTITUTE
MFD. BY
THE M. & M. MFG. C
AKRON, O.
REPAIR OUTFIT
M.&M. RUBBER CEMENT
VULCANIZING



## M & M MANFG CO.
## AKRON, O.

# ONE-PIECE SEAT BENDINGS



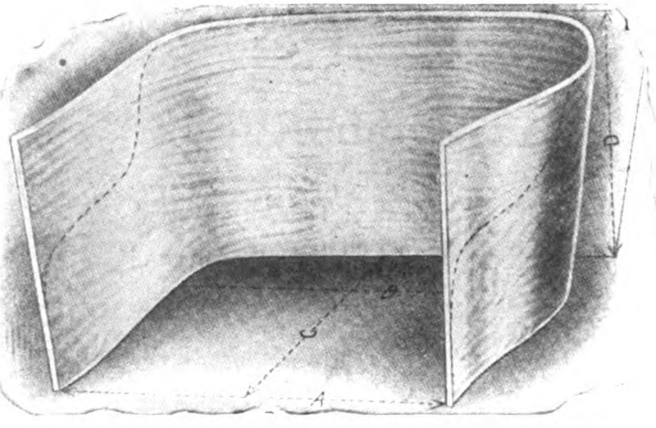
*The Construction that makes faultless*

## SEATS AND BODIES

NO glued joints—painted without danger of peeling—upholstered without expensive framework; combining maximum strength with minimum weight and insuring a durability unapproached by any other manner of construction. Fittings and accessories can be easily attached.

*The way WE make them and the quality of material used makes our proposition of importance to every automobile manufacturer in America.*

We produce all Sizes and Styles



Write to us To-day and let us Send You Full Particulars

**THE TUCKER WOOD WORK CO.**
**SIDNEY OHIO.**

Mr. Motorist:—

You cannot afford to take the word of some other fellow in the important question of tires. The "show me" spirit of "the Man from Missouri" pervades the trade world of today. How many times have you heard and appreciated the truth of the old statement—"The Proof of the Pudding is in The Eating"?

**AJAX TIRES**

are the gratifying result of modern machinery combined with high-class materials and intelligent workmanship. A 5,000 mile written guarantee reflects the confidence of the Ajax-Grieb Rubber Company in their product. Send for a copy.

**Ajax-Grieb Rubber Co.**

General Offices, 1776 Broadway, New York City
Factories: Trenton, N. J.

BRANCHES:
N.Y. City, N.E. Cor. 57th St. & B'way
Boston, 819 a Boylston Street
Kansas City, Mo., 1422 Grand Ave.
Denver, Colo., 1529 Cleveland Place
Seattle, 1102 Broadway
San Francisco, 438 Market Street
Los Angeles, 1038 So. Main St.
Philadelphia, 316 N. Broad Street
Detroit, 743 Woodward Avenue
Chicago, 1418 Michigan Avenue
Milwaukee Agents: Goodyear Rubber Co.

Exhibited at the Grand Central Palace and Madison Square Garden Shows

The Cuts on this page accurately illustrate the largest variety of ignition wire made by any one factory in the world.

# PIRELLI CABLE

Order by number—about 25 m. m. is equal to one inch. Keep this page for reference.

**No. 154 R** 5 m. m. Primary Rubber, Price 10c. per foot

**No. 174 R** 7 m. m. Primary Rubber, Price 12c. per foot

**No. 194 R** 10 m. m. Secondary Rubber, Price 15c. per foot

**No. 214 R** 9 m. m. Extra Quality Secondary Rubber, Price 17c. per foot

**No. 100 R** 7 m. m. Magneto, Price 15c. per foot

**No. 234 R** 12 m. m. High Tension Rubber, Price 25c. per foot

## Cable for
## AUTOMOBILE
## MOTOR BOAT
## AIR SHIP
## MOTOR CYCLE
## or
## STATIONARY
## ENGINE

**Prices to the trade and samples for testing upon application.**

**No. 254 R** 15 m. m. High Tension Rubber, Price 30c. per foot

**No. 154 P** 7 m. m. Primary Cambric Covered, Price 12c. per foot

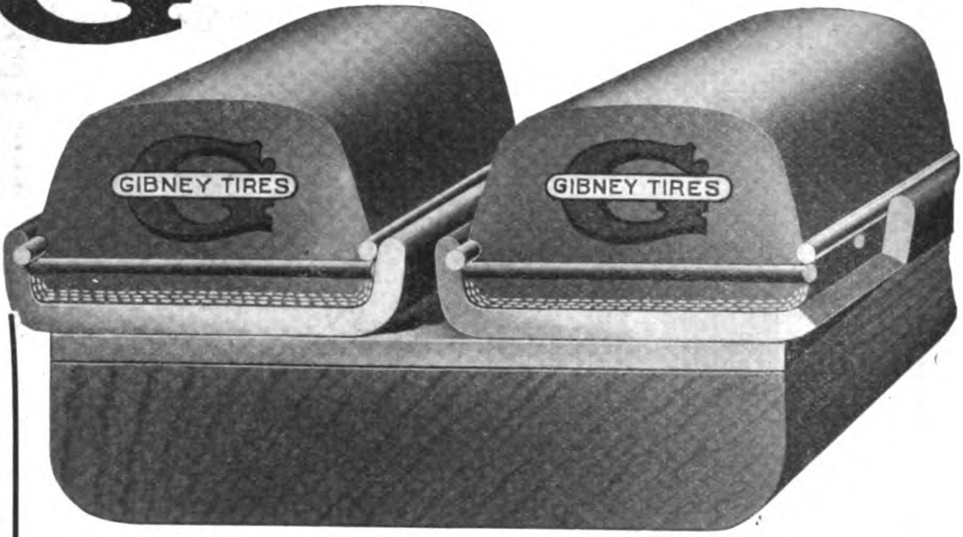
**No. 194 P** 12 m. m. Secondary Cambric Covered, Price 20c. per foot

**No. 154 P** two way, Cambric Covered, Price 15c. per foot

**No. 154 P** four way, Cambric Covered, Price 30c. per foot

**PIRELLI & CO.** (AMERICAN BRANCH), **296 Broadway, New York**

**MOTOR CAR EQUIPMENT CO.,** General Distributors, **55 Warren St., New York City**



GIBNEY TIRES

GIBNEY

SOLID TIRES
and Sidewire Endless
MOTOR TIRES

Although the new **GIBNEY TIRE** has only been on the market one year, it has been an eventful year for the tire trade, because in that time we have proved that the dual type of tire is, beyond all question or doubt, the most practicable.

JAS. L. GIBNEY

GIBNEY TIRES

GIBNEY TIR

If you want to build up a lasting and profitable tire business, you will apply at once for the

# GIBNEY

agency. You will be sure of a first-class article and first-class treatment, because the **GIBNEY** policy means a "square deal" and progressive methods. It is better to sell than sell against the **GIBNEY TIRE** in your territory. A word to the wise is sufficient.

We are sole distributers, for Philadelphia and vicinity, of the celebrated **CONTINENTAL TIRES (Imported).** They have justly earned the title: "Low-cost-per-mile" tire.

We are the largest importers and jobbers of automobile accessories and sundries in Philadelphia or vicinity. We make a specialty of carrying everything needed for either the motorist or his car, provided the article possesses merit. We deal only in standard and reliable products, which is a guarantee that what we catalog is safe for you to buy. Our catalog is therefore sure to interest you. A copy will be sent free upon request.

**&BRO.,** 211-213 N. BROAD ST.
PHILADELPHIA, PA.

GIBNEY TIR

# Where you can find us at the New York Shows

| CYCLE AND AUTOMOBILE TRADE JOURNAL<br>(Published in Philadelphia) | CYCLE AND AUTOMOBILE TRADE JOURNAL<br>(Published in Philadelphia) |
|---|---|
| **Grand Central Palace Show** | **Madison Square Garden Show** |
| December 31 to January 7 | January 16 to January 23 |
| **SPACE No. 23, MAIN FLOOR** | **SPACE No. 513, BASEMENT** |
| ¶ Immediately on entering the main exhibition hall, turn sharply to the right. Our space is against the partition wall, about 50 feet from said entrance. | ¶ Just before entering main exhibition hall, take stairway to the basement. Our space is at the foot of the stairs. |

¶ We will have on file a great deal of valuable data concerning exhibitors, and will be pleased to answer such queries as the trade and others may make. A cordial invitation is extended to all to make our space at the shows headquarters for meetings, etc.

"The Battery with the Strongest guarantee in the world."

THE DURO LINE

For 1909 comprises the largest and most complete showing of storage batteries, electric lamps, coils, and general electric supplies ever offered.

Six years the DurO mark as stood for all that was best for Ignition and Electric lighting. The coming season will see no lessening of our efforts to build the best.

The DurO Line offers to the attention of the manufacturer, trade, and owner

The DurO Dry Storage Battery in copper.
The DurO Dry Storage Battery in wood.
The MoToR Dry Storage Battery in wood.
The Dixie Wet Storage Battery in wood.
The DurO Coils—dash, box, auto, marine.

The DurO Electric Lamps. Searchlights, boat lamps, cabin lamps, gage lamps, tail lamps, head lamps, dash lamps, exploring lamps, etc., etc.

The DurO portable Lantern with self contained battery.

The DurO System with Electric generator for Boat and Auto Lighting.

The DurO Switches, the DurO Wires, and other Specialties.

We will gladly send you our complete catalogue.

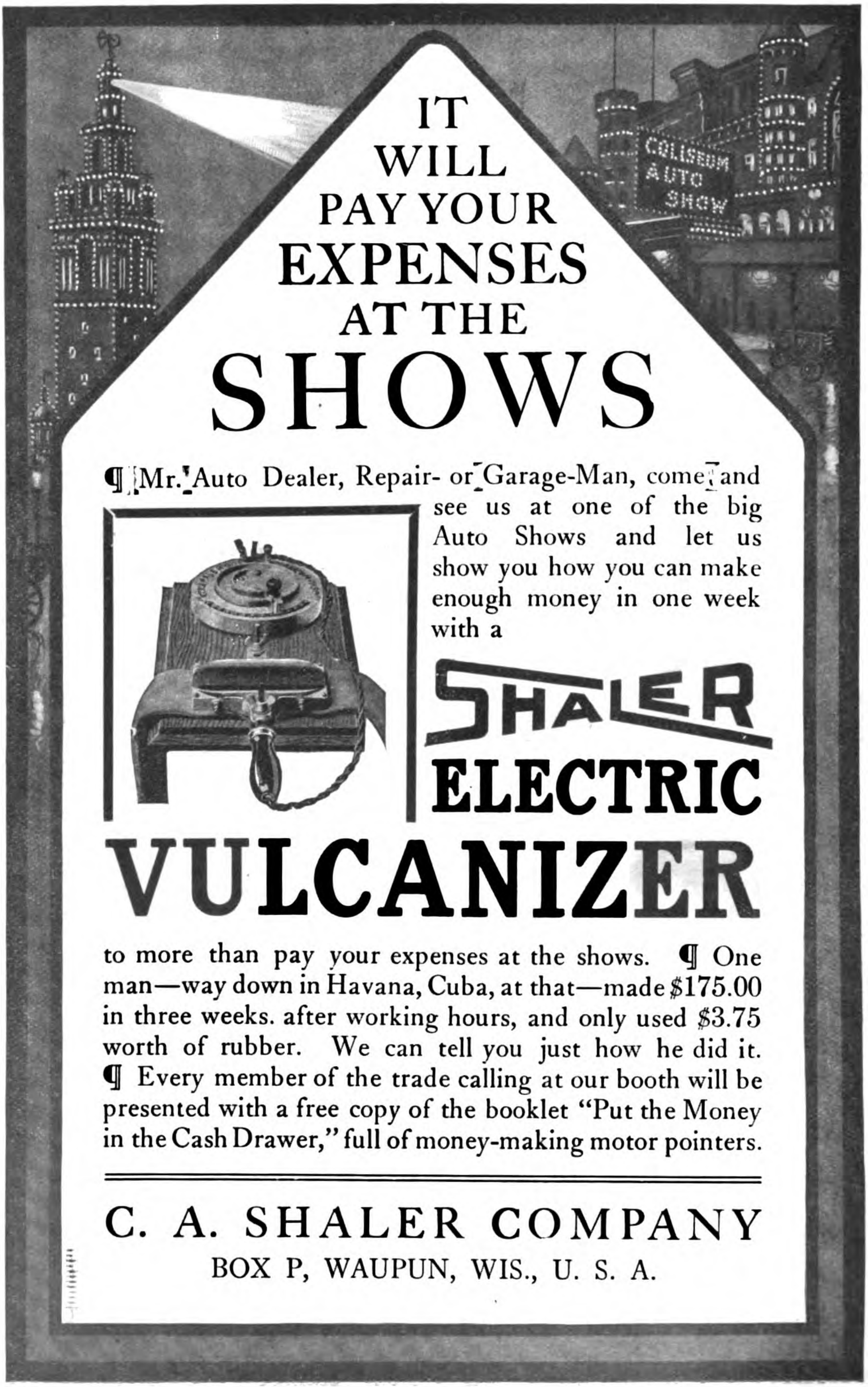
The DurO Line may be purchased through any dealer or jobber. If yours' does not handle and will not furnish you, send his name with your order and we will send goods direct.

**"DurO Factory"**

**CHICAGO BATTERY COMPANY**

**2610-2620 Wabash Avenue, Chicago.**

Branches:—St. Louis, Denver, San Francisco,
Los Angeles, St. Paul.



IT
WILL
PAY YOUR
EXPENSES
AT THE
SHOWS

¶ Mr. Auto Dealer, Repair- or Garage-Man, come and see us at one of the big Auto Shows and let us show you how you can make enough money in one week with a

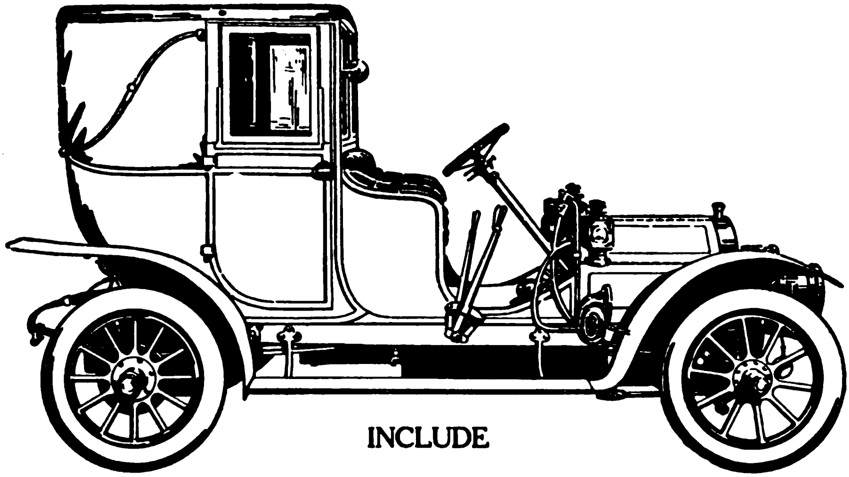
**SHALER**
**ELECTRIC**
**VULCANIZER**

to more than pay your expenses at the shows. ¶ One man—way down in Havana, Cuba, at that—made $175.00 in three weeks. after working hours, and only used $3.75 worth of rubber. We can tell you just how he did it. ¶ Every member of the trade calling at our booth will be presented with a free copy of the booklet "Put the Money in the Cash Drawer," full of money-making motor pointers.

C. A. SHALER COMPANY
BOX P, WAUPUN, WIS., U. S. A.

1908=1909
Pierce Arrow Cars

4 SPEEDS—SELECTIVE



INCLUDE

2 and 3-Passenger Runabouts.
2-3-4-5 and 7-Passenger Touring Cars

AND ENCLOSED BODIES

Landaulet Brougham
Landau Suburban

WITH THE FOLLOWING VARIETY OF CHASSIS

4-cyl. 24-h. p. 6-cyl. 36-h. p. 6-cyl. 60-h. p.
4-cyl. 40-h. p. 6-cyl. 48-h. p. A.L.A.M. Rating

All types of Pierce GREAT ARROW cars may be seen at and Prices obtained of Pierce Arrow dealers in all large cities and at the New York and Philadelphia Automobile Shows in January.

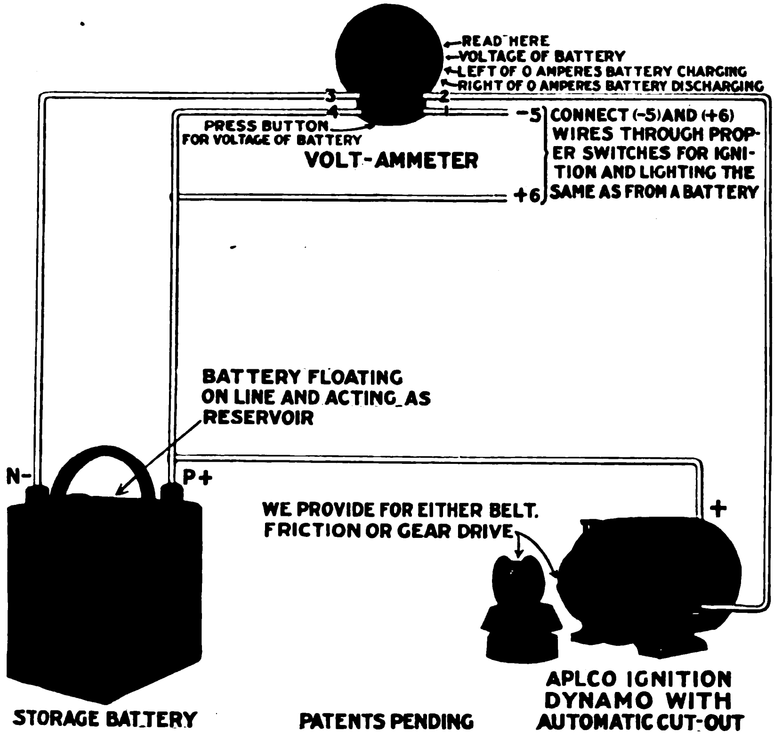
The Geo. N. Pierce Co.

Members Association of Licensed Automobile Manufacturers

BUFFALO, N. Y.

*We announce the* "APLCO" Perfected, up-to-date Dynamo-Floating Storage Battery Ignition System *for* Automobile, Motor Boat *and* Stationary Engine. Make and Break *or* Jump Spark Ignition.

**WIRING DIAGRAM OF "APLCO"-DYNAMO-FLOATING-STORAGE-BATTERY-IGNITION-SYSTEM**


READ HERE
VOLTAGE OF BATTERY
LEFT OF 0 AMPERES BATTERY CHARGING
RIGHT OF 0 AMPERES BATTERY DISCHARGING
3
4
2
1
PRESS BUTTON FOR VOLTAGE OF BATTERY
VOLT-AMMETER
-5
+6
CONNECT (-5) AND (+6) WIRES THROUGH PROPER SWITCHES FOR IGNITION AND LIGHTING THE SAME AS FROM A BATTERY
BATTERY FLOATING ON LINE AND ACTING AS RESERVOIR
N-
P+
WE PROVIDE FOR EITHER BELT. FRICTION OR GEAR DRIVE
+
STORAGE BATTERY
PATENTS PENDING
APLCO IGNITION DYNAMO WITH AUTOMATIC CUT-OUT

¶ Specify and pay the difference for an "APLCO" system on your next automobile, motor boat or stationary engine and it will pay you a handsome interest on the investment. ¶ Send for bulletin No. 3, giving prices and complete information. ¶ We will demonstrate this system at Booth No. 217, Madison Square Garden, January 16th to 23d.

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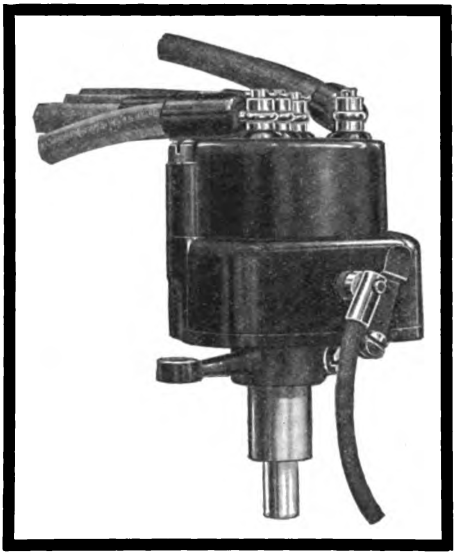
**APPLE ELECTRIC COMPANY**

20 N. CANAL STREET :: :: :: DAYTON, OHIO

# The UNISPARKER



## The Essential Elements of the Atwater Kent Spark Generator in Simplified Form

What the Atwater Kent Spark Generator is to the high-priced car, the **UNISPARKER** is to the car of moderate cost.

The contact maker—the vital element of the system—is the same as that of the Atwater Kent Spark Generator. The coil is also the same. But, instead of putting the contact maker and the coil in one apparatus on the dashboard, they are separated. The contact maker—and a compact distributor with it—is attached to the engine in place of the ordinary timer. The coil bolts to the dash in the usual way. No more fitting is required than that in the ordinary timer and coil.

**PRICES OF UNISPARKER AND COIL**

| | |
|---|---|
| 6-cylinder (with switch for starting on the spark) | $50.00 |
| 4-cylinder “ “ “ “ “ “ | 45.00 |
| 3-cylinder “ “ “ “ “ “ | 45.00 |
| 2-cylinder (switch not self-starting) | 35.00 |

Collar for attaching to half time shaft, 50 cents additional.
Specify size of shaft when ordering.

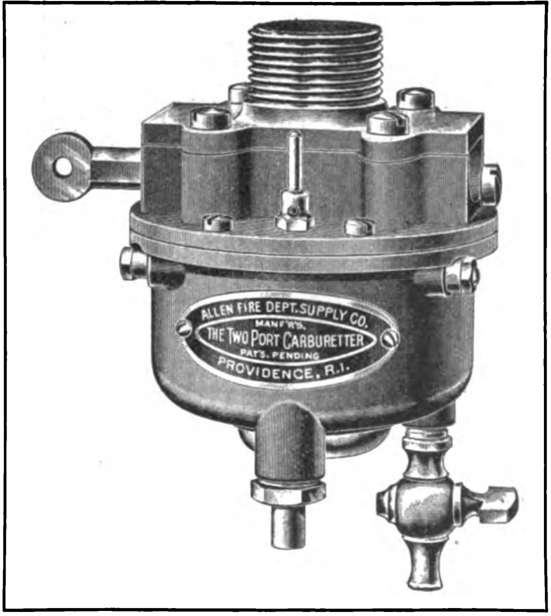
**Every Dealer in the United States Should Have the UNISPARKER in Stock**

*First Come, First Served*

**Atwater Kent Manufacturing Works**
**42 North Sixth Street, Philadelphia, Pa.**

# The
# Two-Port Carburetor

## SCIENTIFIC :: MECHANICAL



This instrument is of the Float Feed Type, and so arranged that the air and gas are mixed in proper proportions in every position of the throttle.

It is built throughout on scientific and mechanical principles, contains no springs to give trouble by expanding or contracting, nor any sensitive valves to stick.

The Two-Port Carburetor excels all others in the production of such explosive quality of mixture, that it will produce greater power and greater speed than any carburetor made.

Every test that has been made and every comparison has proven the instrument far superior to any other make, and we bar none.

AGENTS WANTED EVERYWHERE

## Allen Fire Department Supply Company

**Branch: 67-69 Park Place, New York Factory: Providence, Rhode Island**

PUMPELLY
IGNITION STORAGE BATTERY
PUMPELLY
BATTERY CO.
INDIANAPOLIS, IND.

# Many an Automobile is Damned

Not through any fault of its construction,

Not through any fault of its engine:

But merely because of a "bum" battery!

Nine-tenths of the troubles of the automobile and launch arise from faulty ignition.

# PUMPELLY BATTERIES

Eliminate all that. The Pumpelly-Storey Company produced one of the first storage batteries on the market—and the best.

The years that have since elapsed have been years of improvement and refinement, until now Mr. Pumpelly is able to offer a storage battery that for strength of current, steadiness and long life is incomparably superior to anything else in the field.

It is important that every maker and user of automobiles investigate it.

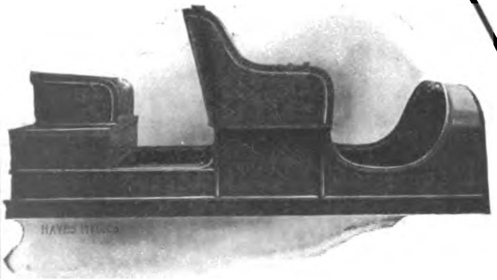
**PUMPELLY BATTERY CO.**

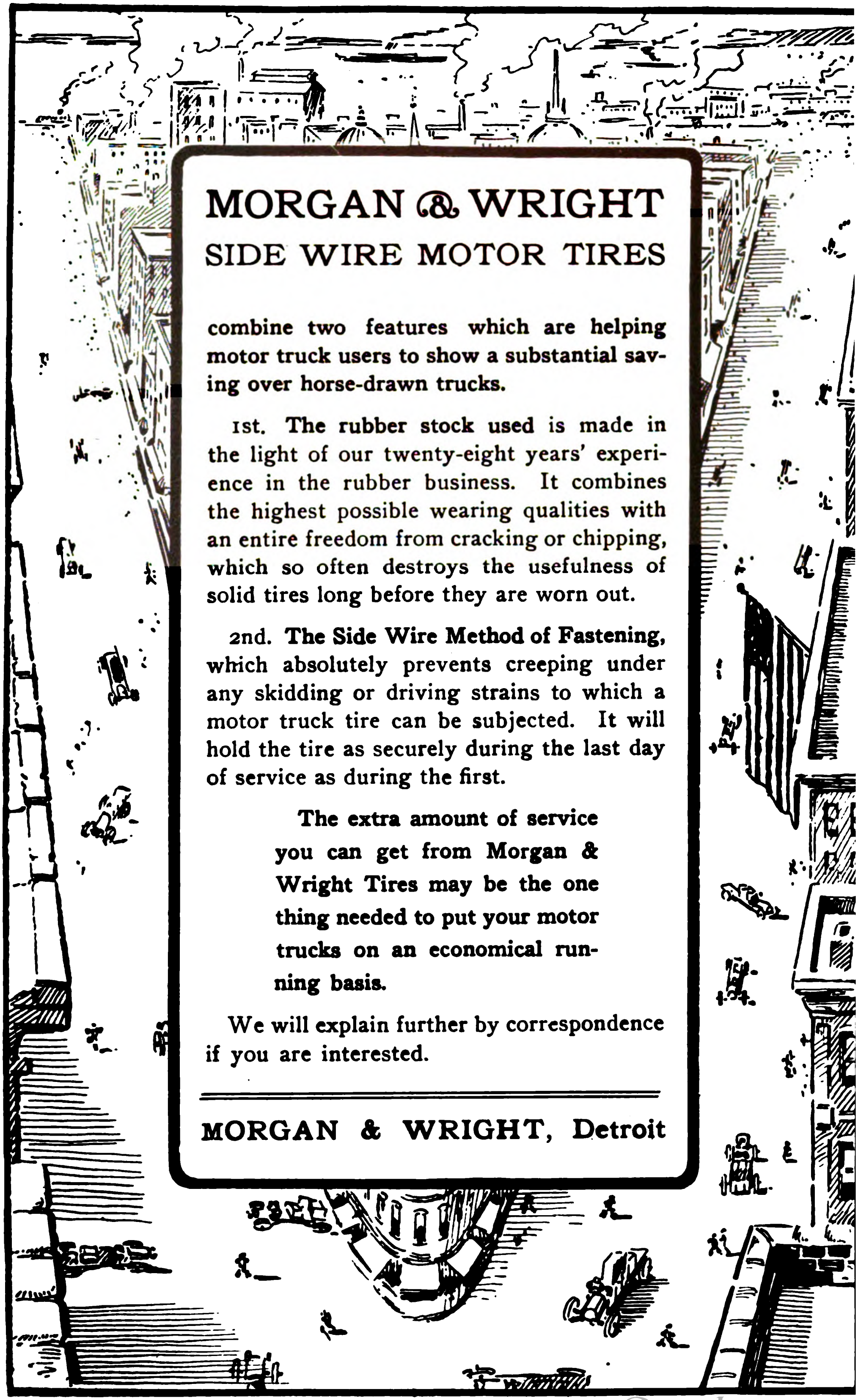
1226 East 22nd Street INDIANAPOLIS, IND.

Hoods
Dashes
Radiators
Fenders
Tanks
Body and Seat
Irons
Metal Bodies
Battery Cases
Coil Cases
Mufflers
Tool Boxes
Battery Boxes
Drip Pans (Floor)
Fender Irons
Tire Cases
(Auto)

**Hayes**
**Products**
**Always**
**Reliable**

**Hayes**
**Manufacturing**
**Company**
**Maybury and Grand**
**Trunk Railway**
**Detroit :: Mich.**





# MORGAN & WRIGHT

## SIDE WIRE MOTOR TIRES

**combine two features which are helping motor truck users to show a substantial saving over horse-drawn trucks.**

1st. **The rubber stock used** is made in the light of our twenty-eight years' experience in the rubber business. It combines the highest possible wearing qualities with an entire freedom from cracking or chipping, which so often destroys the usefulness of solid tires long before they are worn out.

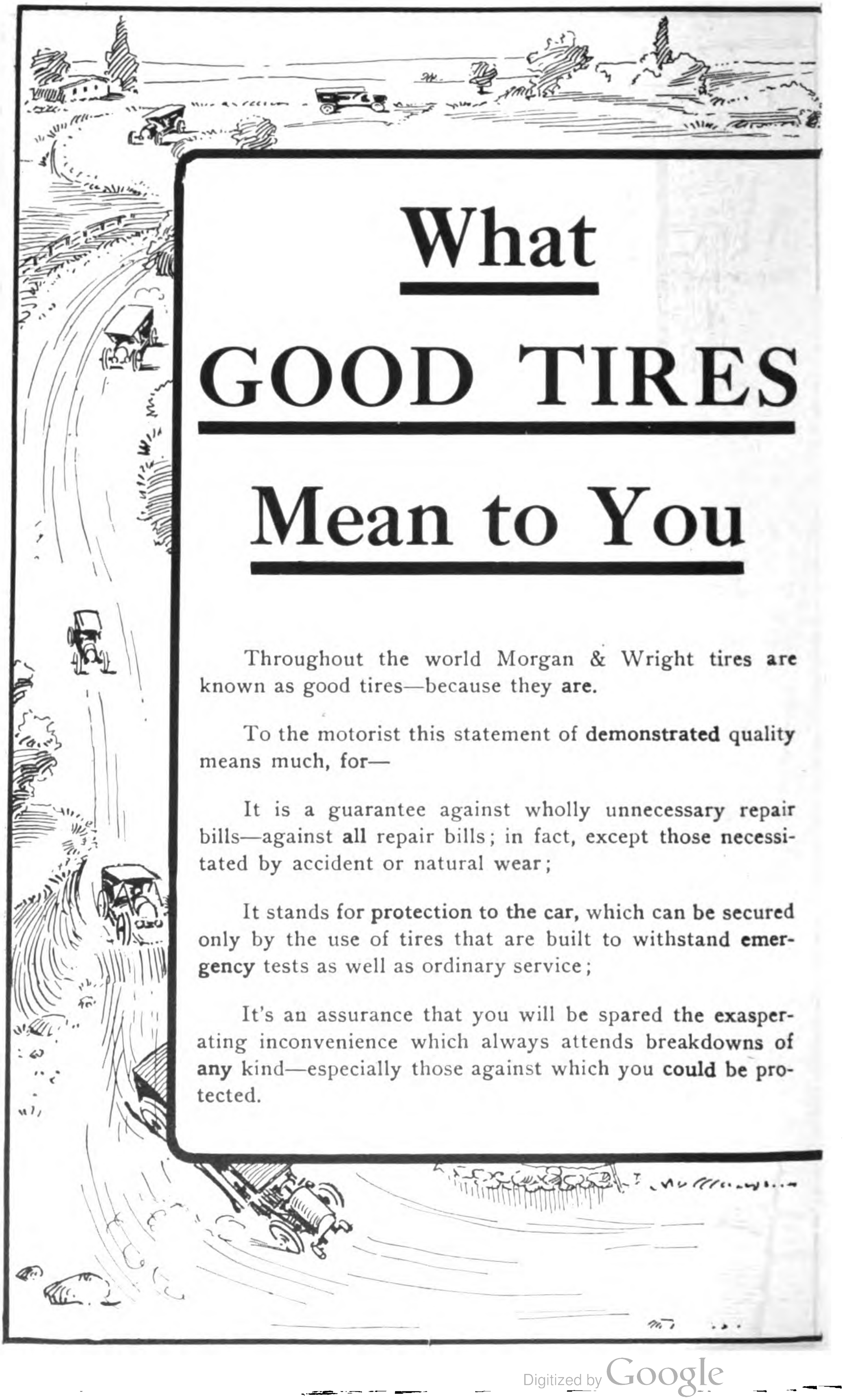
2nd. **The Side Wire Method of Fastening,** which absolutely prevents creeping under any skidding or driving strains to which a motor truck tire can be subjected. It will hold the tire as securely during the last day of service as during the first.

**The extra amount of service you can get from Morgan & Wright Tires may be the one thing needed to put your motor trucks on an economical running basis.**

We will explain further by correspondence if you are interested.

---

**MORGAN & WRIGHT, Detroit**



# What

# GOOD TIRES

# Mean to You

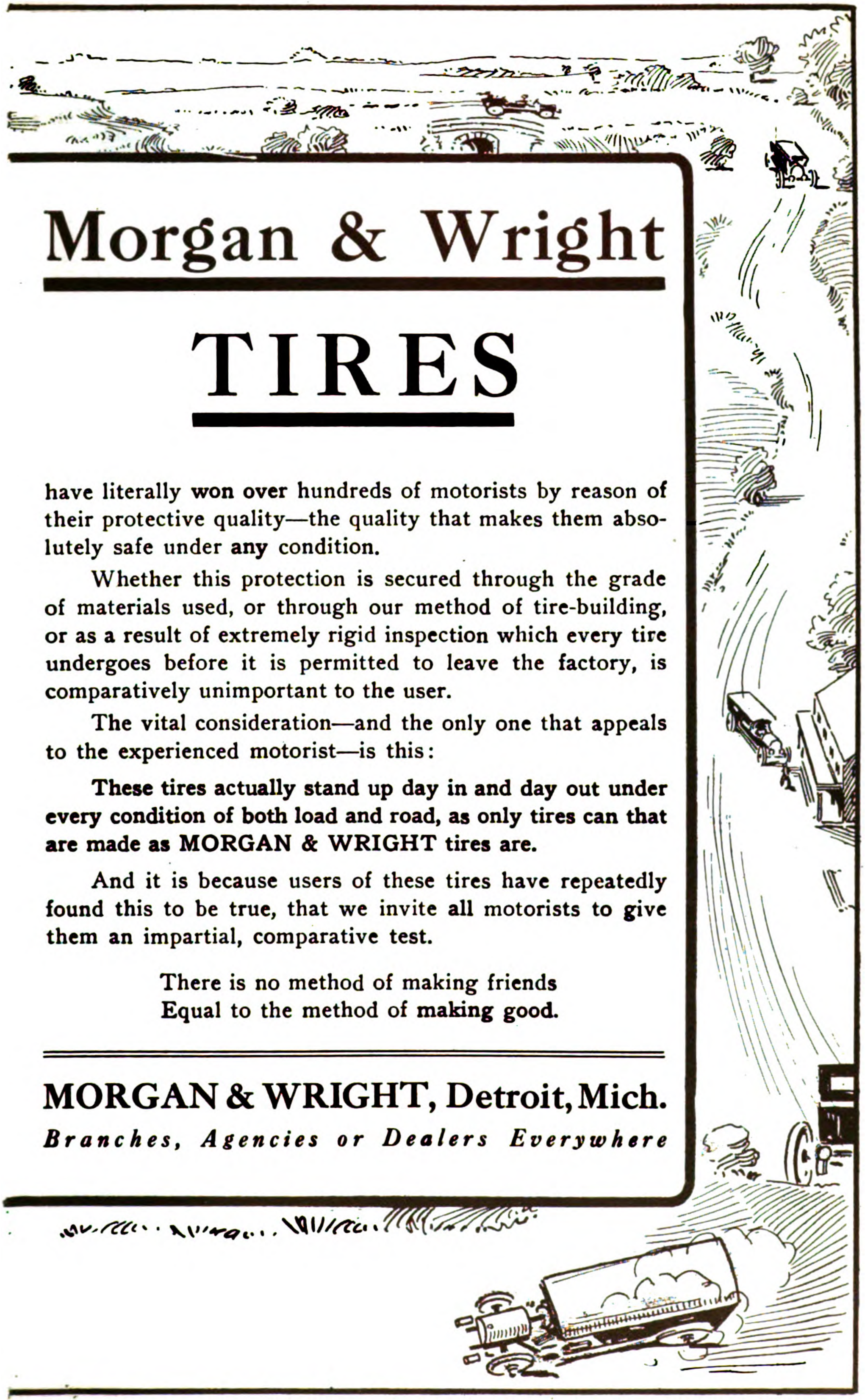
Throughout the world Morgan & Wright tires **are** known as good tires—because they **are.**

To the motorist this statement of **demonstrated** quality means much, for—

It is a guarantee against wholly unnecessary repair bills—against **all** repair bills; in fact, except those necessitated by accident or natural wear;

It stands for **protection to the car,** which can be secured only by the use of tires that are built to withstand **emergency** tests as well as ordinary service;

It's an assurance that you will be spared the **exasperating** inconvenience which always attends **breakdowns of any** kind—especially those against which you **could be protected.**



# Morgan & Wright

# TIRES

have literally won over hundreds of motorists by reason of their protective quality—the quality that makes them absolutely safe under any condition.

Whether this protection is secured through the grade of materials used, or through our method of tire-building, or as a result of extremely rigid inspection which every tire undergoes before it is permitted to leave the factory, is comparatively unimportant to the user.

The vital consideration—and the only one that appeals to the experienced motorist—is this:

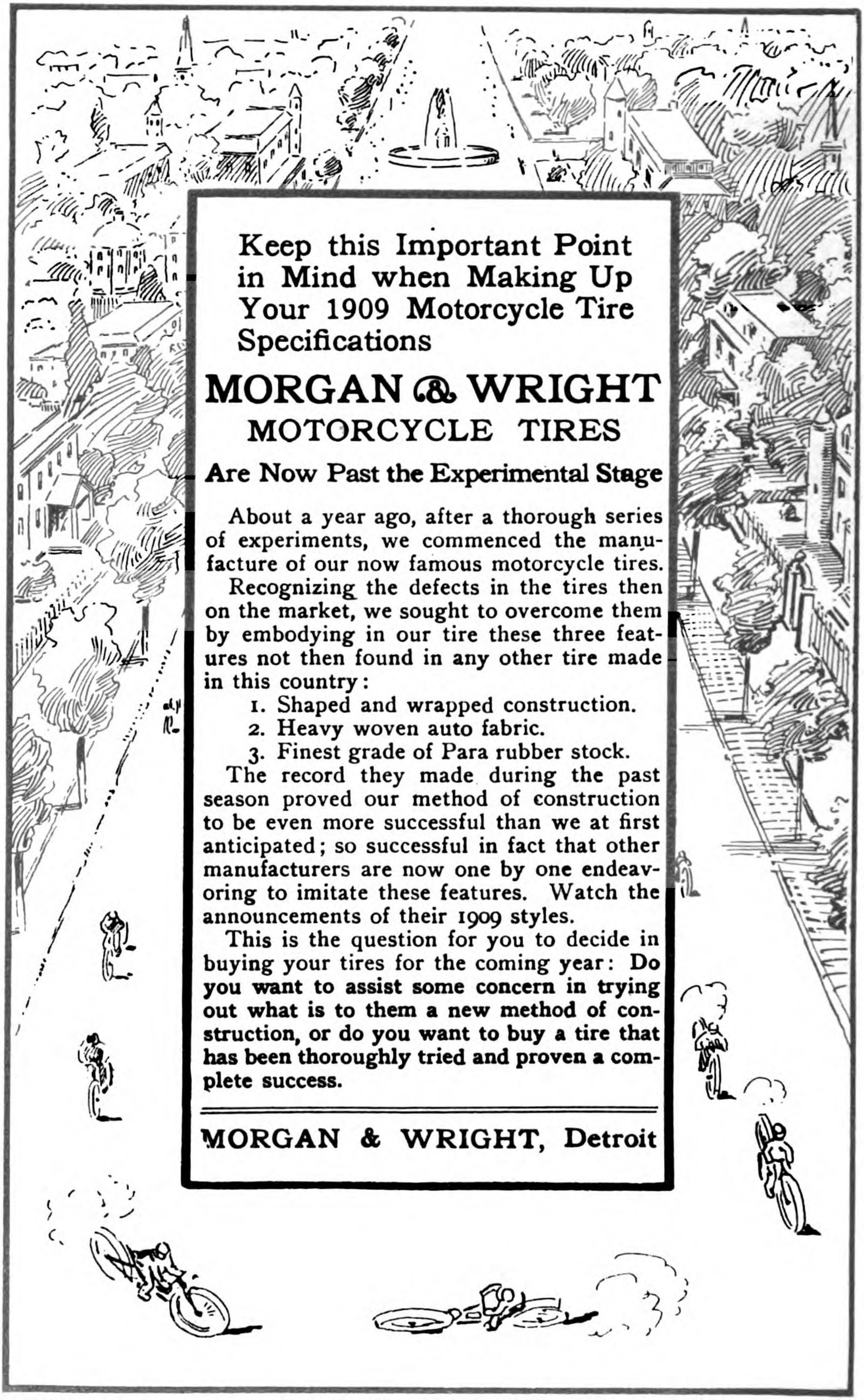
**These tires actually stand up day in and day out under every condition of both load and road, as only tires can that are made as MORGAN & WRIGHT tires are.**

And it is because users of these tires have repeatedly found this to be true, that we invite all motorists to give them an impartial, comparative test.

There is no method of making friends
Equal to the method of making good.

**MORGAN & WRIGHT, Detroit, Mich.**

***Branches, Agencies or Dealers Everywhere***



## Keep this Important Point in Mind when Making Up Your 1909 Motorcycle Tire Specifications

# MORGAN & WRIGHT
## MOTORCYCLE TIRES

### Are Now Past the Experimental Stage

About a year ago, after a thorough series of experiments, we commenced the manufacture of our now famous motorcycle tires.

Recognizing the defects in the tires then on the market, we sought to overcome them by embodying in our tire these three features not then found in any other tire made in this country:

1. Shaped and wrapped construction.
2. Heavy woven auto fabric.
3. Finest grade of Para rubber stock.

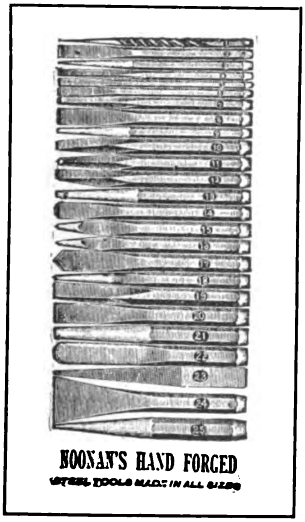
The record they made during the past season proved our method of construction to be even more successful than we at first anticipated; so successful in fact that other manufacturers are now one by one endeavoring to imitate these features. Watch the announcements of their 1909 styles.

This is the question for you to decide in buying your tires for the coming year: **Do you want to assist some concern in trying out what is to them a new method of construction, or do you want to buy a tire that has been thoroughly tried and proven a complete success.**

---

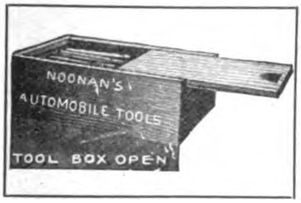
**MORGAN & WRIGHT, Detroit**

# A. S. Noonan Tool & Machine Works


NOONAN'S HAND FORCED
STEEL TOOLS MADE IN ALL SIZES

Don't forget to see us at the Palace Show, Space 405, and Garden Show, Space 560, where we will show and demonstrate to **you** over 35 original tools and specialties of the highest grade and quality.

We figured this year on giving out a souvenir, but instead we have decided to make a special price for some one of our famous punches or chisels out of our sets. This is the only place we ever sell them singly. Be sure and get one before leaving either show.


NOONAN'S AUTOMOBILE TOOLS
TOOL BOX OPEN

NOONAN'S AUTOMOBILE TOOLS
LEATHER CASE CLOSED

Be sure and have our salesman show you all of Noonan's Tools and Specialties, for they must be seen to be appreciated.

Send for our descriptive catalogue, showing 30 original tools and specialties.

**A. S. Noonan Tool & Machine Works**
**Rome, N. Y., U. S. A.**

WEAR LONGEST
EMPIRE TIRES
MPIRE
TRADE MARK

## EMPIRE AUTOMOBILE TIRE COMPANY

**Factory—TRENTON, N. J., U. S. A.**

**BRANCHES.**

NEWARK—264 Halsey St. DETROIT—842 Woodward Ave. BOSTON—292 Devonshire St CHICAGO—20 La Salle St. CHICAGO—1301 Michigan Ave. NEW YORK—73d and Broadway. NEW YORK—148 Chambers St.

**AGENCIES.**

PITTSBURG—Consumers' Auto Supply Co. KANSAS CITY, MO.—Empire Tire & Rubber Co. ATLANTA, GA.—Dunham Rubber Co. CLEVELAND, O.—Motor Supply Agency Co. NORFOLK, VA.—Wm. H Grover. DENVER, COL.—Denver Auto Goods Co. JACKSONVILLE, FLA.—Savell Rubber Co. PHILADELPHIA, PA.—Penn Auto Supply Co. LOS ANGELES, CAL.—Pacific Electrical Wks. BUFFALO, N. Y.—Empire Sales Co. MINNEAPOLIS, MINN.—Empire Tire & Rubber Co. SAVANNAH, GA.—Harris Tire Co. NEW ORLEANS, LA.—H. A. Testard.

USE

NON-GRAN CORED-BARS

Mr Owner

WHEN YOU HAVE YOUR CAR OVERHAULED this winter insist upon having the new bearings made of a metal sure to meet the requirements of the most severe automobile service.

THE FURTHER YOU GET from the metal best suited for automobile requirements, the sooner the whole operation will have to be repeated.

AROUND THE WORLD without any attention other than oiling, and home again in perfect condition, is the record of the twenty-five NON-GRAN Bearings in the famous "Thomas Flyer." YOU CAN HAVE JUST SUCH SERVICE if you will insist upon it.

NON-GRAN IS USED BY SUCH MANUFACTURERS AS

American & British Mfg. Co.
Mitchell Motor Car Company
The Autocar Company
Nordyke & Marmon Company
Providente Engineering Works
Purdue University
E. R. Thomas Motor Co.
The Rauch & Lang Carriage Co.
Waltham Manufacturing Co.
Woods Motor Vehicle Company
Otis Elevator Company
etc., etc., etc.

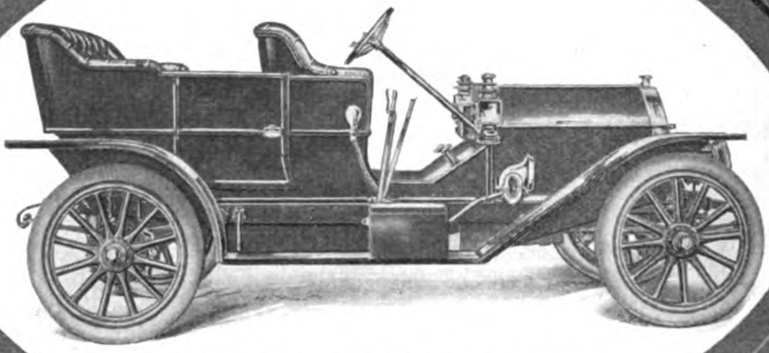
WRITE US TO-DAY FOR THE NAMES of the repairmen nearest you, who are already stocked with our

NON-GRAN CORED-BARS

in different sizes, ready to be turned up into new Bearings, or send us the name of your regular repairman and we will send him a sample of the metal and a booklet telling him how quickly and how well he can do your work by their use.

Hereafter the word "NON-GRAN" will be cast on all NON-GRAN Bars.

AMERICAN BRONZE COMPANY
BERWYN PA., U.S.A.



The Inter-State Touring Car, Model 25, $1750

# Announcement

## THE INTER-STATE CARS

The coming of the INTER-STATE marks a new era in automobile history.

From every man and woman interested in automobiling, either as present owner or as a prospective purchaser, the INTER-STATE commands attention—

Because—

It belongs to the highest class of the 1909 Automobile; is a perfectly-made, light-running, easily-controlled, speedy, graceful, enduring car.

**And is sold at a price—$1750.00 complete, including Eisemann Magneto—but little higher than the price asked for the "good-enough-until-later" cars.**

Of this latter type there are many. The market is flooded with their titles and book-pages are crowded with their claims.

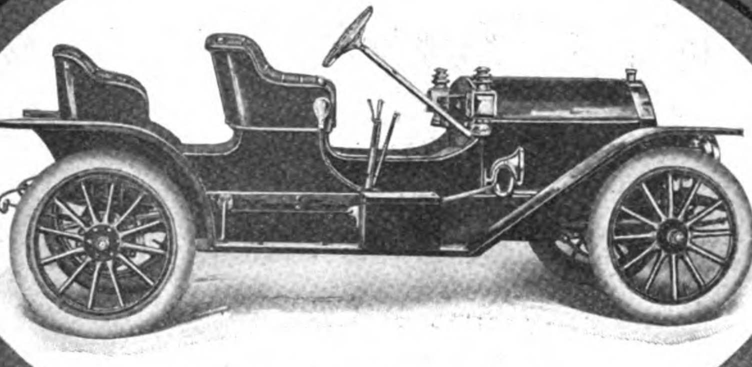
Of the INTER-STATE type there is but one at anywhere near **its price**. And it is the INTER-STATE.

Where is the economy or the automobile satisfaction in buying a car that you will probably discard next year for a **real** car? Would it not be actual economy and also "good business" to buy the **real** car, the **satisfying** car, the **lasting** car, **this** year—especially since you can buy **this** kind of a car for just a little more money than is asked for the **temporary** car?

If you want an automobile and do not feel like paying anywhere from twenty-five hundred to five thousand dollars—

Here is a car—the INTER-STATE—that will suit your price requirements and give you the quality you really want.

**In style, comfort, speed, ease of control, and low cost of up-keep, the INTER-STATE finds its only competition in the high-grade, high-priced cars, all of which sell for far more money than the INTER-STATE.**



The Inter-State Roadster, Model 28, $1750

The INTER-STATE AUTOMOBILE CO. is a new company, and the INTER-STATE is a new car. But the men behind them—Thomas F. Hart, F. C. Ball, J. M. Maring, G. A. Ball, T. F. Rose, and E. B. Ball—are men who represent millions in capital and an equal wealth of business honor.

They are not the kind of men to trifle with the public or trade by false standards. They have built one of the greatest factories in the world, have installed the most modern machinery that money could buy, and have gathered under their management an ideal organization of automobile brains and skill, for just one purpose—to make this superb car that Claude E. Cox has designed, the INTER-STATE.

Why have they done this? Because they realized that the INTER-STATE would occupy a field absolutely distinct from that occupied by any other car, namely, **the highest type of an automobile from every viewpoint, at a low price.**

**This is the car that we want you to see. We want you to drive it, and give it every possible test, before you think of spending your money for a cheaper car—or for even a higher-priced car. We will be content to accept your judgment as to its value at $1750.00.**

**It will be exhibited at Grand Central Palace, New York, December 31st to January 7th, and at the Coliseum, Chicago, February 6th to 13th.**

**Dealers and agents will quickly appreciate the opportunities open to them by the INTER-STATE. Our proposition is unusually attractive. Write us.**

**Inter-State Automobile Co., 124 Willard St., Muncie, Ind.**

## Specifications:

FRAME—Pressed from cold rolled steel, special stock.

FRONT AXLE—"I" beam, drop forged in one piece—not welded—and double heat treated.

REAR AXLE—The reliable semi-floating type with large axle shafts and Hyatt Roller Bearings.

WHEELS—Artillery type, 12 spokes, 1½ inch, 34 inches diameter.

TIRES—Standard Goodyear Quick Detachable, Continental or Diamond, 34 x 4 inches.

BRAKES—Four 12-inch brakes all acting on rear hubs external and internal.

TRANSMISSION—Three speed selective type and reverse with vanadium steel gears. The selective mechanism built inside transmission case, thoroughly lubricated at all times.

GEAR RATIO—3½ to 1, giving from 5 to 60 miles on high gear.

HORSE POWER—35-40.

MOTOR—Four-cylinder, 4¼ x 5, water-cooled, cylinders cast in pairs.

CRANK SHAFT—Special drop forging, 35 to 40 carbon steel, double heat treated.

IGNITION—Double system Eisemann Magneto, commutator, battery and quadruple coil.

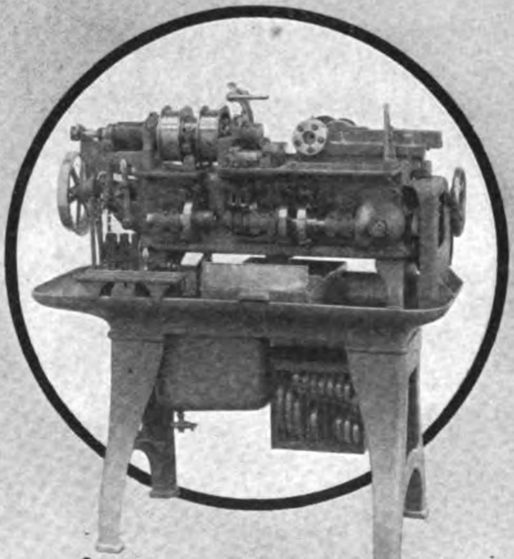
BODY STYLES—Touring Car, Roadster, Tourabout and Demi-Tonneau.

WHEEL BASE—112 inches; TREAD, 56½ in.

COLOR—Standard Inter-State red.

PRICE—With best of equipments, head lights and generator, side oil lamps, tail lamp, tube horn, tire repair kit and tools, Eisemann magneto, F. O. B. Muncie, $1750.

# BROWN & SHARPE MFG. CO.



**Providence, R.I., U.S.A.**

THE amount of time spent in refinishing small duplicate parts usually offsets the advantage gained by rapid production.

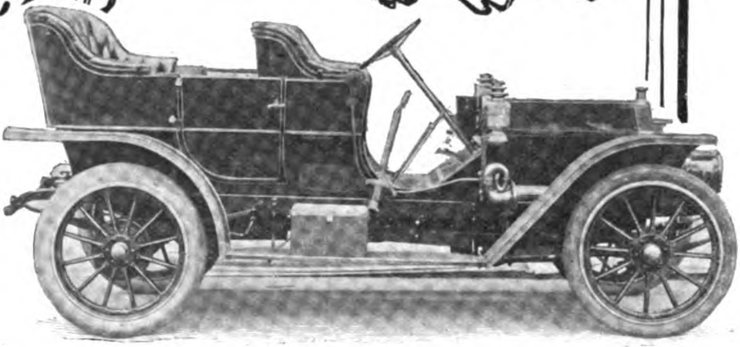
## B. & S. AUTOMATIC SCREW MACHINES

Turn out duplicate parts that are accurate

Send samples for estimates of production.

Circulars describing Constant Speed Drive Automatic Screw Machines on application.

# Pullman



## '09 Announcement

We are ready for 1909 business. As hitherto in years past the "PULLMANS" will maintain leadership as positively the very best Automobile value obtainable.

If it is possible to attain perfection we have reached that state in the 1909 "PULLMAN" cars.

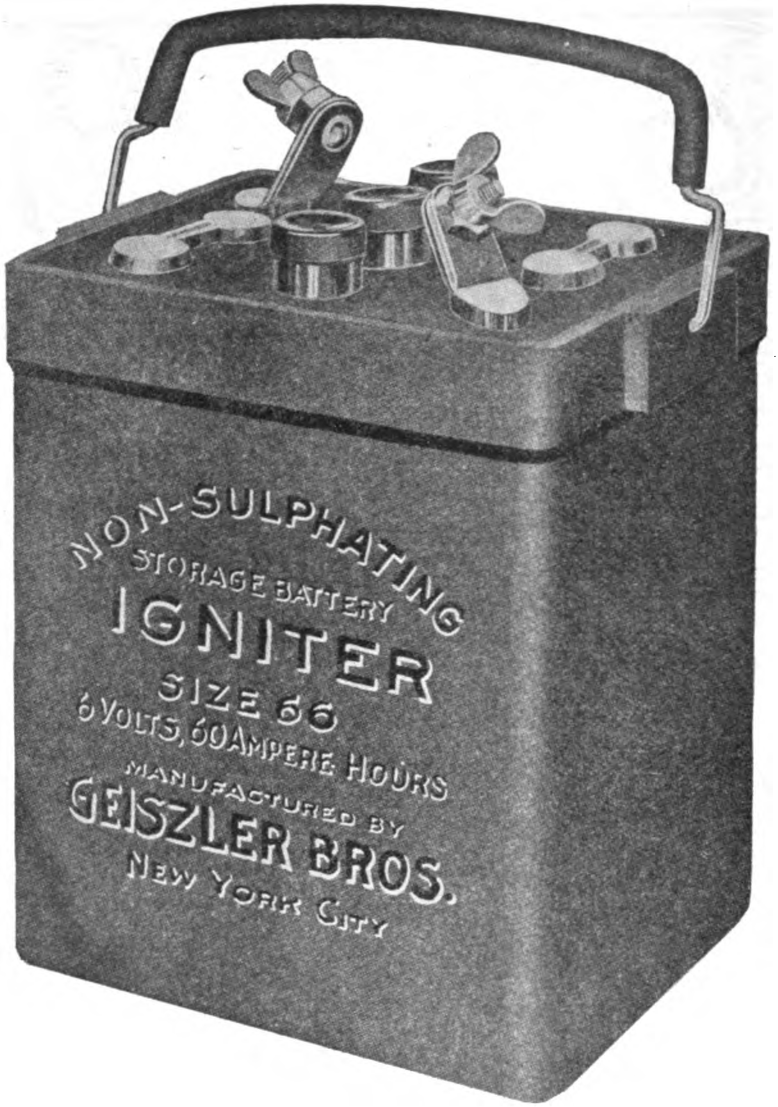
Viewed from any standpoint—as a prospective purchaser or a dealer in Motor Cars—you can't match the "PULLMAN" quality—the "PULLMAN" prices nor the wonderful "PULLMAN" efficiency,—design,—simplicity of construction,—ease of operation,—economy of up-keep,—durability; and in fact "PULLMANS" are in every feature incomparably superior to any cars yet designed.

Every step from the raw material to the finished car in the process of the making of a "PULLMAN" Automobile is under the eye of an expert in OUR OWN FACTORY and we stand back of the quality—which is the highest standard that can be produced.

In your own interest don't buy a car, don't accept an agency, until you have full particulars about 1909 "PULLMAN" CARS.

A model to meet every requirement at the right price. WRITE TODAY.

**York Motor Car Company, York, Pa.**


NON-SULPHATING
STORAGE BATTERY
IGNITER
SIZE 66
6 VOLTS, 60 AMPERE HOURS
MANUFACTURED BY
GEISZLER BROS.
NEW YORK CITY

SIZE 66—6 VOLTS
60 AMPERE HOURS
PRICE - - $15.00
GUARANTEED ONE YEAR

GUARANTEED SUPERIOR
TO ANY OTHER
STORAGE BATTERY
REGARDLESS OF PRICE

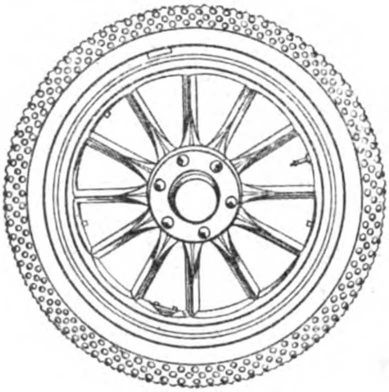
GEISZLER BROTHERS
STORAGE BATTERIES
516-522 West 57th Street
NEW YORK CITY

THE ORIGINAL AND ONLY GUARANTEED NON-SULPHATING STORAGE BATTERY

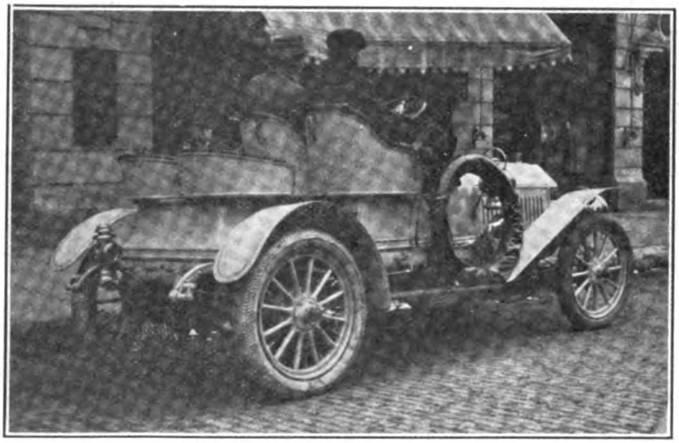
# BRICTSON

## Detachable Tire Tread

**The Greatest of Anti-Skids**



**Especially Adapted for City Use**



**This Shows the Brictson Tread Applied to the Tires,**

The Brictson Detachable Tread is made of chrome leather and canvas, with steel studs on traction surface to prevent skidding and take the wear of the road, and large oval-head rivets on the sides to take the wear of the ruts, etc.

It is shaped like an ordinary tire casing and completely envelops the tire proper, so there can be no injury from the road to any part of the tire. Absolutely prevents blow-outs. The Brictson Tread is held in place simply by air pressure between the tire and rim—being so simple and yet so efficient that once on, and the tire properly inflated, it is impossible for it to pull off or get out of place.

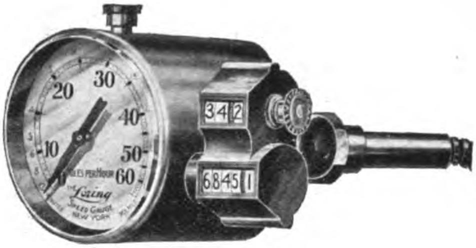
The Brictson Tread does not interfere in the least with the resiliency of the tire. It is neat, substantial and will wear for years. Does away with the necessity for chains or other mud grips.

You really can't afford to be without it.

Write for prices and further particulars.

**The Brictson Manufacturing Co., Brookings, S. D.**

**See our New Tread for city use at the Madison Square Garden Show, New York City; also at Chicago**


Loring
Speed Gauge
New York

**Model A, $35.00**

# THE Loring SPEED-GAUGE

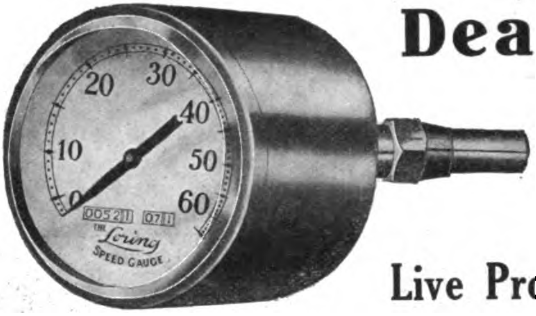
FOR

## Automobiles and Motorcycles

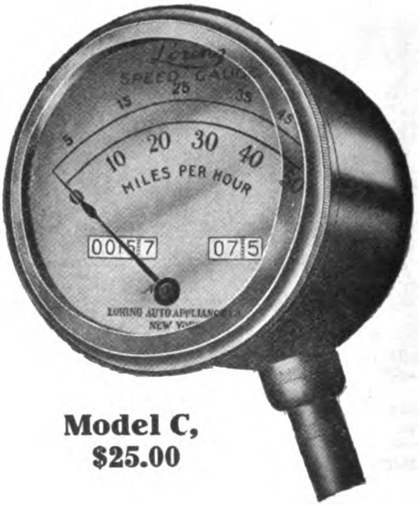
## Dealers

Write for Live Proposition

The composite ideas of our Critics and friends and the latest development of the art—An Instrument built on true scientific and centrifugal lines, that will register correctly and will stand the grief.


The Loring
Speed Gauge

**Model B, $45.00**


Loring
Speed Gauge
Miles per hour
Loring Auto Appliance Co.
New York

**Model C, $25.00**

**Guaranteed for 5 Years**

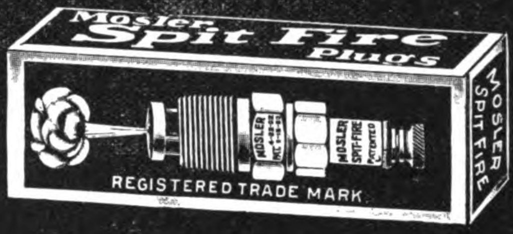
30 days' trial at our expense.
Send for booklet today.

---

**The Loring Auto Appliance Company**
1779-81 Broadway, New York, N. Y.

ACCEPT NO SUBSTITUTE

PACKED
IN
THIS BOX


Mosler
Spit Fire
Plugs
MOSLER
SPIT FIRE
MOSLER
SPIT-FIRE
REGISTERED TRADE MARK

FOR
YOUR
PROTECTION

ALL GENUINE

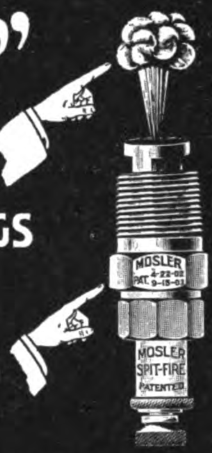
MOSLER

"Spit-Fire"

TRADE MARK

PLUGS

HAVE
the name on
Porcelain and Base,
are contained in boxes
on which is printed
an illustration of a
PLUG
SHOOTING A FLAME
(Registered Trade Mark)

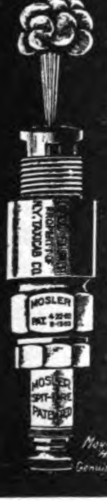

MOSLER
PAT. 4-22-02
9-15-03
MOSLER
SPIT-FIRE
PATENTED

THE ONLY PLUG
that actually spits fire is

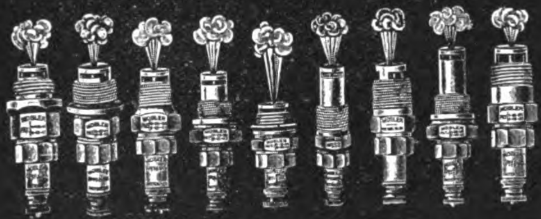
The MOSLER
SPIT FIRE
None genuine unless stamped
Beware of imitations.

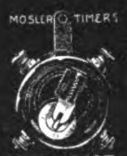
OVER 500.000
NOW IN GENERAL USE

WE PROTECT
our Registered Trade Mark
DEALERS
AND JOBBERS
BEWARE!!

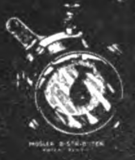

MOSLER
PAT. 4-22-02
9-15-03
MOSLER
SPIT-FIRE
PATENTED

Magneto Type
Have extra Heavy
Genuine iridium Platinum points.




MOSLER TIMERS

ARE THE BEST.


MOSLER DISTRIBUTER

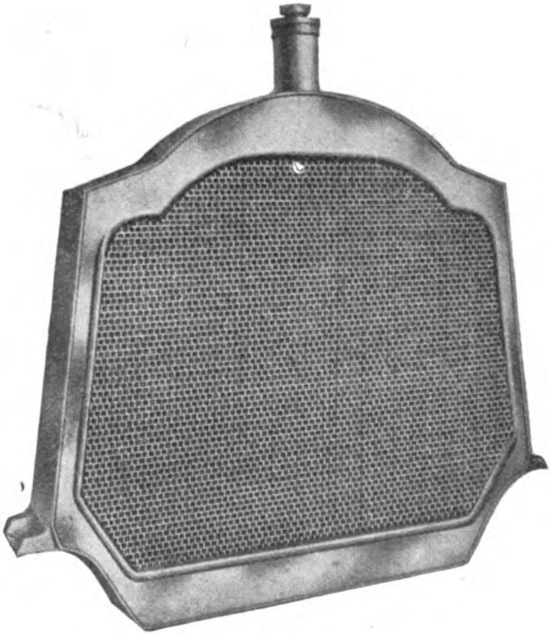
Mosler
Spit Fire
Plugs
MADE TO FIT ANY ENGINE, ANY THREAD.
WILL FIRE THE CHARGE UNFAILINGLY.
ENERGETIC IGNITION — GREATER POWER
AND STAND MORE SOOT, OIL AND WATER
THAN ANY OTHER PLUGS.

A.R.Mosler. 163 W. 29th St. New York, N.Y.

WE WILL NOT EXHIBIT AT
THE SHOWS, BUT

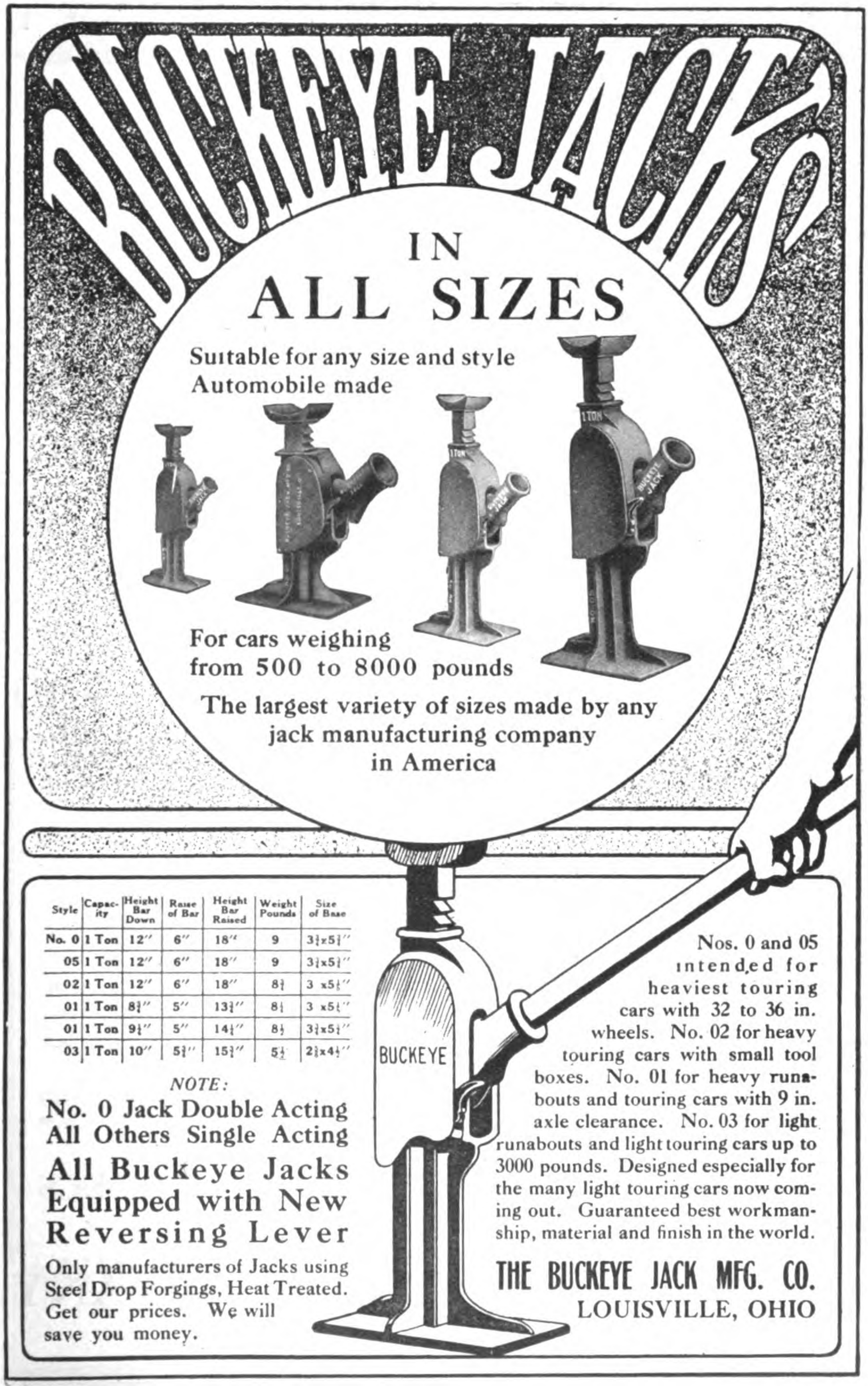
FEDDERS

RADIATORS



The real square tube radiator—
The New York to Paris Radiator
Will be very much in evidence on the LEADERS.
Look for them. Cut shows one.
You know the make.

FEDDERS MFG. WORKS
BUFFALO, N. Y.



# BUCKEYE JACKS

## IN ALL SIZES

Suitable for any size and style
Automobile made

For cars weighing
from 500 to 8000 pounds

The largest variety of sizes made by any
jack manufacturing company
in America

| Style | Capacity | Height Bar Down | Raise of Bar | Height Bar Raised | Weight Pounds | Size of Base |
|---|---|---|---|---|---|---|
| No. 0 | 1 Ton | 12″ | 6″ | 18″ | 9 | 3¾x5¾″ |
| 05 | 1 Ton | 12″ | 6″ | 18″ | 9 | 3¼x5¼″ |
| 02 | 1 Ton | 12″ | 6″ | 18″ | 8¾ | 3 x5¼″ |
| 01 | 1 Ton | 8¾″ | 5″ | 13¾″ | 8¼ | 3 x5¼″ |
| 01 | 1 Ton | 9¼″ | 5″ | 14¼″ | 8½ | 3¼x5¼″ |
| 03 | 1 Ton | 10″ | 5¾″ | 15¾″ | 5½ | 2⅜x4½″ |

*NOTE:*

**No. 0 Jack Double Acting**
**All Others Single Acting**

**All Buckeye Jacks Equipped with New Reversing Lever**

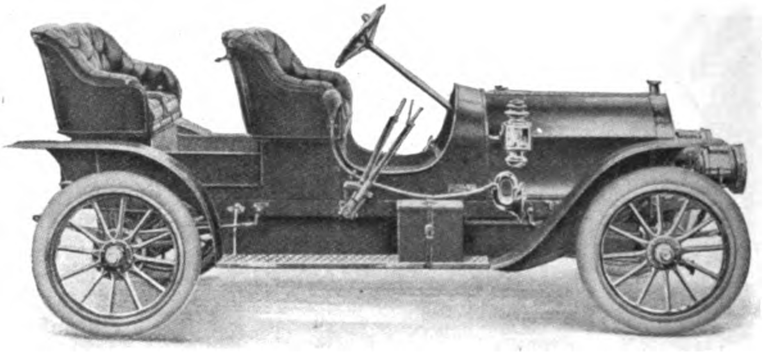
Only manufacturers of Jacks using Steel Drop Forgings, Heat Treated. Get our prices. We will save you money.

Nos. 0 and 05 intended for heaviest touring cars with 32 to 36 in. wheels. No. 02 for heavy touring cars with small tool boxes. No. 01 for heavy runabouts and touring cars with 9 in. axle clearance. No. 03 for light runabouts and light touring cars up to 3000 pounds. Designed especially for the many light touring cars now coming out. Guaranteed best workmanship, material and finish in the world.

**THE BUCKEYE JACK MFG. CO.**
LOUISVILLE, OHIO

## THE MOST FOR THE MONEY

# THE AUBURN



**Model B, $1400.00**

## 1909

A four cylinder, 25-30 H. P., light touring car: handsome, strong. Ample power and speed to meet your necessities.

## 1909

If you were to engage an **Expert** you would be governed by his experience and the results he has accomplished. Have you been waiting for a tried and proven manufacturer to produce a four cylinder car which is right in price? If so, you will find it in the Auburn Model "B." There are always people who want the best, who put quality first. It is for just such people that this car has been made. A light, classy touring car, with power and weight proportioned to secure the greatest efficiency.

### SPECIFICATIONS:

**MOTOR.** Four vertical cylinders, cast separately, 4 x 4, 25-30 H. P.

**CLUTCH.** Multiple disc.

**TRANSMISSION.** Selective type, sliding gear, three speeds forward and one reverse, direct on high.

**BRAKES.** Two sets; external and internal, acting on rear hubs.

**WHEEL BASE.** 106 inches.

**AXLES.** Rear, live type; front, dropped "I" beam section.

**BODY.** Straight line type, detachable tonneau.

**IGNITION.** Jump spark. Current supply storage battery. Magneto furnished when ordered.

## 1909 PRODUCT--SIX DISTINCT MODELS

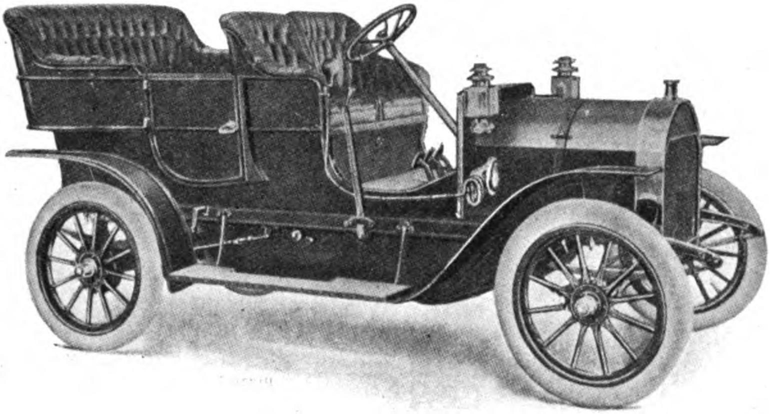
*Write for Particulars*

## AUBURN AUTOMOBILE COMPANY

Auburn, Indiana

# THE MOST FOR THE MONEY

# THE AUBURN



Model G, $1250.00

## 1909 1909

For eight years we have been building strictly high-class cars. During that time cars have come and gone by the score, yet the position of the ***Auburn*** is stronger to-day than ever before.

### EFFICIENCY IS WHAT COUNTS

We would like to have you compare the ***Auburn*** with any car in the market at within $500.00 of the price.

This car is made to sell at $1250.00 and it is worth every cent it costs. If you will give the car a chance it will speak for itself. It is powerful; has plenty of room, the ideal family car.

### SPECIFICATIONS:

**MOTOR.** 5¼ x 5. Double opposed. 24 H. P.

**TRANSMISSION.** Planetary; two speeds forward and one reverse.

**WHEEL BASE.** 100 inches.

**TIRES.** 32 x 3½ inches.

**AXLES.** Front, ball bearing; rear, Hyatt roller bearing.

**BODY.** Side entrance; five passenger.

## 1909 PRODUCT--SIX DISTINCT MODELS

*Write for Particulars*

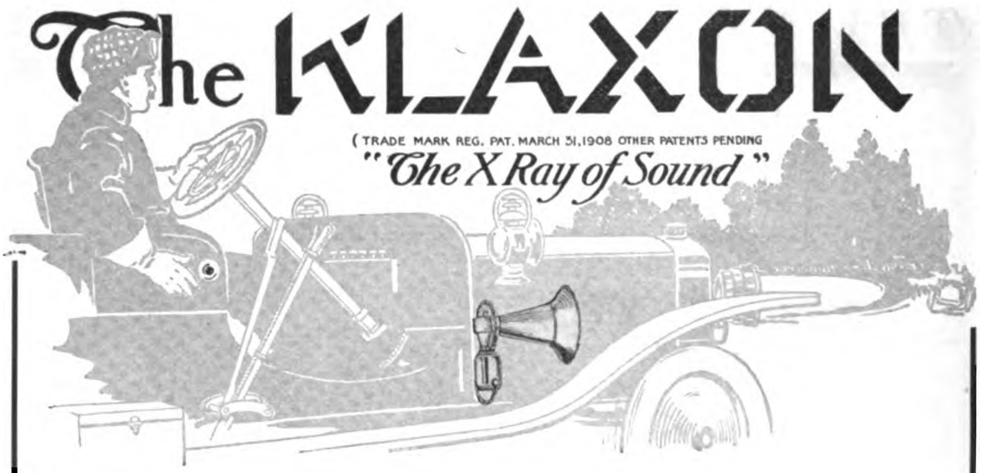
## AUBURN AUTOMOBILE COMPANY

Auburn, Indiana

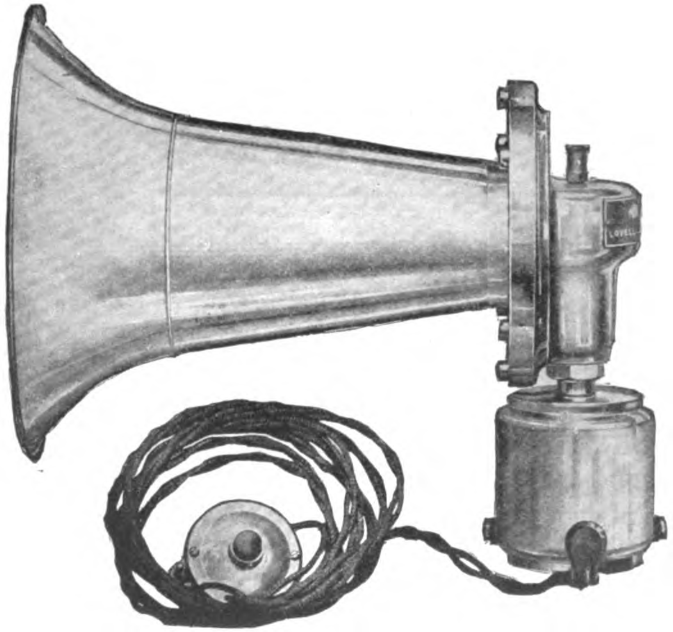
# The KLAXON

(TRADE MARK REG. PAT. MARCH 31, 1908 OTHER PATENTS PENDING

*"The X Ray of Sound"*



**Decidedly the Most Powerful Motor-Car or Boat Warning Signal Ever Produced. It Starts and Stops Instantly**



**Special Types for Marine Use.**

**Damp—Rust—Water Proof.**

**Operates from 6-Volt Storage Battery or 8- Cell Dry Battery.**

**Finished in Black Rubber Enamel at No Extra Charge.**

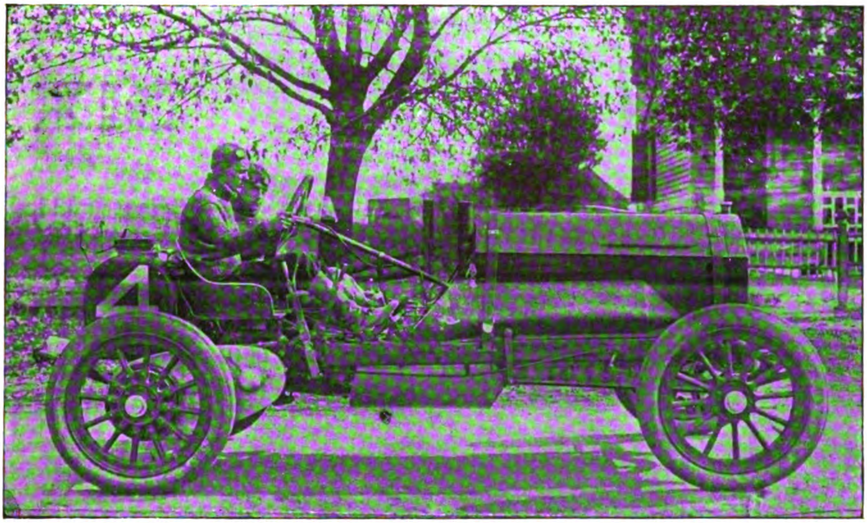
**Regular Finish, Polished Brass.**

**PRICE** Type L (Long Projector) complete for installation, **$35.**
Type S (Short Projector) complete for installation, **30.**

# Lovell McConnell Mfg. Co.

## NEWARK, N. J.

**C. S. KNOWLES, Sales Agent, 1 Madison Avenue, N. Y. City**



THE ABOVE ILLUSTRATION IS OF THE VICTORIOUS TEST CAR OF THE PERFECTED TYPE OF THE

GREAT
Chadwick
SIX

This car made its initial appearance in the Wilkes-Barre Hill Climb, May 30th, 1908, at which time it shattered all records. Since that time it has won all the big hill-climbs of 1908 in which it was entered, and would easily have won the Vanderbilt Cup Race had it not been for a crippled magneto in the seventh lap.

Thus we have tried and tested the

**Perfected Great Chadwick Six**

and these new models will be exhibited for the first time at the Automobile Shows, where the victorious test car and duplicate chassis will be offered for sale with Tourabout, Touring Car and Runabout bodies.

We have abandoned the policy of making yearly models, and our new type of car will be known as the

**Perfected Great Chadwick Six**

You are cordially invited to make a critical examination of our new models at Space 33 (main floor), Grand Central Palace New York, December 31 to January 7

**CHADWICK ENGINEERING WORKS**
**POTTSTOWN, PA., U. S. A.**

Standard Manufacturers, A. M. C. M. A.

# THE
# Great Chadwick Six

has more exclusive and meritorious features than any automobile in the world.

Why? Because of CHADWICK ingenuity.

## The Great Chadwick Six

was practically the first large, six-cylinder car made in the world.

Why? Because of CHADWICK ingenuity.

## The Great Chadwick Six

was the first automobile of 60 H. P. that could travel as fast—if not faster—than special racing machines of double the horsepower.

Why? Because of CHADWICK ingenuity.

## The Great Chadwick Six

was the first six-cylinder car to make popular high-grade automobiles of this type, because of its success in demonstrating the advantages of six cylinders.

Why? Because of CHADWICK ingenuity.

It is because of this CHADWICK ingenuity that many improved, exclusive features have contributed to the great range of control and vast volume of power not obtained in any other car in the world. It is not a car which is a result of copying from other makes, but was developed along original, practical and exclusive lines. It is an exclusive car for the exclusive buyer who is willing to pay a fair price for an automobile which is superior to all others.

## The Great Chadwick Six

was one of the first six-cylinder cars built in America. We were the first manufacturers to build six-cylinder cars exclusively. The pronounced success of the six-cylinder car—due to CHADWICK ingenuity—immediately popularized this type of automobile, and to-day practically all the leading automobile manufacturers are building six-cylinder cars.

These conclusive facts would make manifest the superiority of the six-cylinder type of car and secure the leadership of the CHADWICK in this field—both in experience and perfection of product.

## The Great Chadwick Six

is the car for the buyer who wants and will insist upon having the best. Proof of CHADWICK superiority is made evident by inspection and demonstration.

New and perfected CHADWICK models will be exhibited for the first time at Grand Central Palace, New York, Show.

# IMPROVEMENTS

Note the following improvements in the "Perfected" GREAT CHADWICK SIXES initially exhibited at Grand Central Palace, New York.

**WHEEL BASE**—Seven-passenger Touring Car and Tourabout, 130″; Racing Runabout type, 112″.

**BRAKES**—Four very large and improved brakes, equipped with air-cooled shoes 1$\frac{3}{8}$″ in thickness, instantly adjustable. The new brakes are most efficient and will endure more service and abuse than any brake hitherto used on a motor car.

**CLUTCH**– Improved internal expanding type. The band can be entirely removed for inspection in 30 seconds without disturbing adjustment in any wise.

**DRIVE**—The only ABSOLUTELY SILENT chain drive in existence—sprockets and chrome nickel steel chains are so constructed and contained in oil-tight cases that chain noise is completely eliminated in the new model.

**MAGNETO**—Improved Bosch high tension, equipped with perfected advance device, which insures easy starting on quarter turn without use of the battery system

**HORSE-POWER**—An absolute increase of 35 per cent in power; this great increase is obtained by refinements and improvements, while the bore of 5″ and stroke of 6″ remains the same as in 1908 model.

**LUBRICATOR**—Improved; the flexible shaft has been replaced with a direct shaft drive; sight feeds or bleeds contained in glass, so that individual feeds can be instantly inspected.

**COOLING**—A most efficient type of Honey-Comb Radiator is used in place of the cellular type.

**TIMING**—Hardened chrome nickel-steel time gears, cam shaft and cams accurately ground by special grinding machines; valve lifts readily adjustable.

**SPRINGS**—Exhaustive tests of the improved suspension have demonstrated greatly increased resiliency and stability. Chadwick patented device insures perfect steering control in event of spring breakage.

**STEERING GEAR**—New Chadwick system of gear, instantly adjustable with large heavy steering post and 19″ wheel. The new steering device is made of chrome nickel steel throughout. The hand sectors on wheel controlling the gas and spark are of a new and perfected type.

**CONTROL**—The gear shift lever, segment, and locking device are much heavier and the design is improved. The emergency brake lever is also heavier, while clutch, foot brake and foot accelerator are all adjustable for position and refined in appearance.

**BODIES**—The bodies are much larger, while the workmanship and material are the very best that careful attention and unrestricted expenditure can obtain.

New and perfected CHADWICK models will be exhibited for the first time at Grand Central Palace, New York, Show.

## Following are the Principal Specifications of the 1909 Model of the

# Great Chadwick Six

**Motor:** Six cylinder, 5" bore and 6" stroke, copper jacketed in pairs.

**Transmission:** Semi-selective, mounted on D. W. F. imported ball bearings, four forward speeds and reverse, actuated by single control lever.

**Wheel Base:** 130" and 112", Thread 56".

**Springs:** Semi-elliptic front, platform rear, made from imported oil-tempered steel.

**Frame:** Chrome nickel steel, bottle-neck type.

**Axles:** Chrome nickel steel of "I" section pattern, drop forged in one piece.

**Drive:** Double chains enclosed in oil-tight aluminum cases, readily adjusted without disturbing cases.

**Brakes:** Foot brake, bronze shoes, air-cooled, 1⅜" thick, with cork inserts on very large drum located on jack shaft.
Emergency brake, pull hand lever to rear wheels, internal expanding dust-proof system of very liberal dimensions; very thick shoes are of bronze with cork inserts.

**Cooling:** Water. Capacity 8 gallons, circulated by centrifugal pump.

**Ignition:** Two complete systems, magneto and battery (Simms-Bosch Magneto, high tension) (Imported coil and high tension Distributer on battery system).

**Gear Ratio:** Fourth speed, 2¼ to 1; third speed, 3 to 1; second speed, 4½ to 1, first speed, 9 to 1.

**Weight:** 3450 lbs.

**Gasoline Tank:** Capacity 25 gallons.

**Body:** Aluminum. Seats seven comfortably.

**Upholstery:** Best hand-buffed leather, genuine hair-filled.

**Color:** Carmine or Brewster Green. Special colors extra.

**Wheels:** 36" x 4" front; 36" x 5" rear.

**Equipment:** Rushmore searchlights, standard side oil lamps, rear signal, tools, jack, pump and horn.

**Top:** Extra.

**FULL SEVEN PASSENGER TOURING CAR OR DETACHABLE TONNEAU TOURABOUT, $5500.00**
**F. O. B. POTTSTOWN, PA., U. S. A.**

# Racing Runabout

Wheel base 112", weight 3000 lbs. Same general specifications as the Touring car and Tourabout. Semi-elliptic springs are employed in this model in place of the platform type.

This model, stripped and tuned for racing, demonstrated a speed of 107 miles per hour, actual. Price, $6500, F. O. B Pottstown, Pa

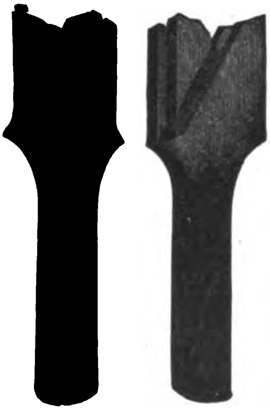
Apply for literature and address communications to Department S.

## CHADWICK ENGINEERING WORKS
## POTTSTOWN, PA.

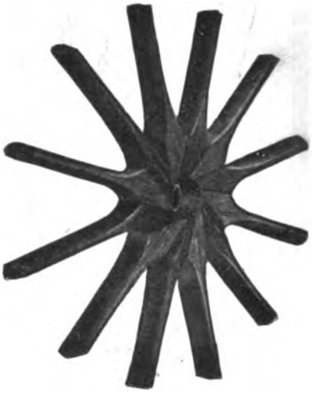
New and perfected Chadwick Models will be exhibited for the first time at Grand Central Palace, New York, Show.

**Standard Manufacturers, A. M. C. M. A.**

# THE
# Schwarz Wheel
FOR
## Automobiles and Heavy Vehicles



**Schwarz Patent Spoke**



**Spokes Compressed**

The only wheel with absolute spoke support. The spokes at the tenons are grooved and mortised for interlocking and are put together at one time under pressure, insuring trueness. **They can never work loose.** When put together they form a compact immovable assemblage and the wheel may be completed with metal rim for tire and shipped without a hub.

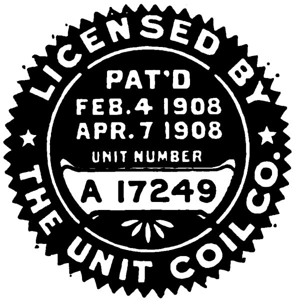
## The Best and Strongest Artillery Wheel Made

Send for illustrated booklet.

These are some of the cars equipped with Schwarz Wheels, because they are the best to be had:

Peerless, Winton, Packard, Cadillac, Lozier, American Locomotive, Premier, Crawford, Matheson, Stearns, Thomas, Apperson, Baker Electric, Columbus Buggy Electric, Fritchle Electric, Atlas, Chadwick, Autocar, Sultan, Grout, Acme, Mack Truck, Hewitt Truck, Gaeth, Mora, Frayer-Miller, Marmon, Selden, Oscar Lear Truck, American Motor Truck, Lansden Truck, Knox, Garford, Mason, Walter, Napier, Tincher, Rauch & Lang Electric, Reliance Truck.

## The Schwarz Wheel Co.
## Philadelphia, Penna.


LICENSED BY THE UNIT COIL CO.
PAT'D
FEB.4 1908
APR.7 1908
UNIT NUMBER
A 17249

LICENSED BY THE UNIT COIL CO.
PAT'D
FEB.4 1908
APR.7 1908
UNIT NUMBER
A 17249

**SEAL**
**(COPY)**

# WARNING!

After January 1st, 1909

## A RED SEAL

will be attached to the outside of

## All Ignition Coil Units

made under our patents
and sold by our licensees

THE UNLICENSED
Manufacturers, Users or Vendors
WILL BE PROSECUTED

## THE UNIT COIL CO.

Address license application to the Secretary,

**15 Exchange Place**
**JERSEY CITY N. J.**

**SEAL**
**(COPY)**

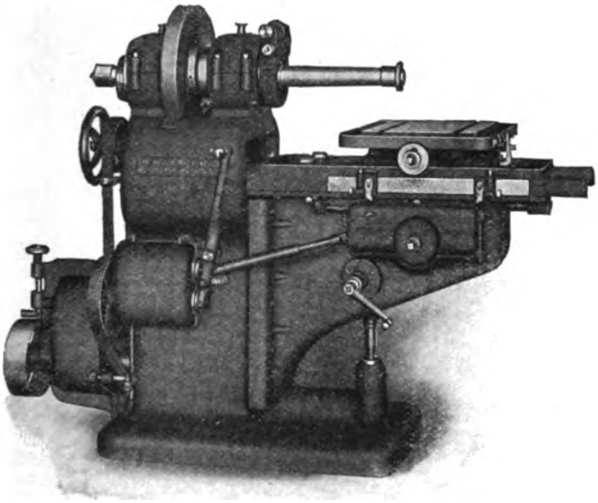
LICENSED BY THE UNIT COIL CO.
PAT'D
FEB.4 1908
APR.7 1908
UNIT NUMBER
A 17249

LICENSED BY THE UNIT COIL CO.
PAT'D
FEB.4 1908
APR.7 1908
UNIT NUMBER
A 17249

# *A Big Step Forward*

is made when you adopt

# HEALD GRINDERS



## The Heald Ring and Surface Grinder

This is the standard machine for finishing Piston Rings to accurate thickness to properly fit the Piston.

Also valuable for Discs, Dies, Thrust Collars, etc.

Send for special catalogs. Made in six styles.

## The Heald Cylinder Grinder

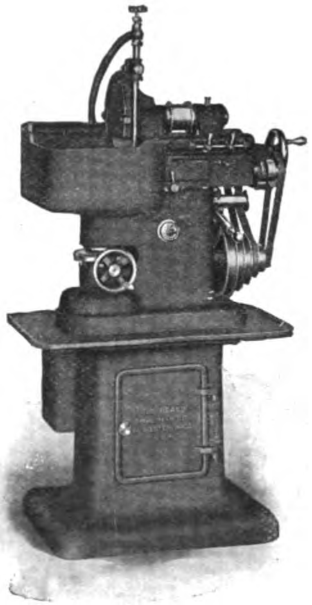
solves the whole problem of finishing your cylinders.

No more expense for reamers or for keeping reamers sharp.

No cylinders oversize when reamers are sharp, and undersize when reamers are dull.

No matter whether the iron is hard or soft, it's all the same.

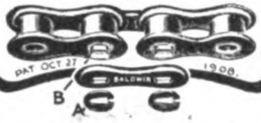
The only satisfactory and successful machine and method on the market today.



THE HEALD
MACHINE CO.
14 New Bond Street
WORCESTER, MASS.

# BALDWIN

## CHAINS & SPROCKETS



Baldwin Improved Chains are the best in design and excellent in accuracy and workmanship. The Clip A is easier to remove and replace than a cotta pin. It will not cut off or come off, and can be replaced several times. Send for sample before placing your chain order.

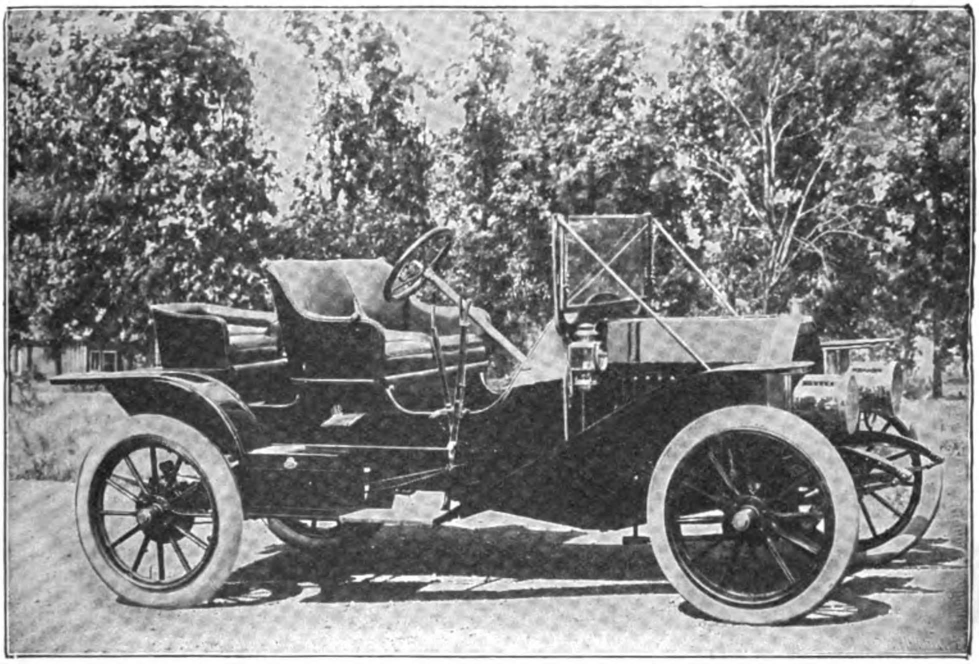
**Sprockets**—We are prepared to make sprockets of all kinds in large quantities at low prices.

Agents: H. V. GREENWOOD, 166 Lake St., Chicago, Ill.
H. D. SIMMONS, 1717 Broadway, New York, N. Y.
M. A. BRYTE, 718 Mission St., San Francisco, Cal.

**BALDWIN CHAIN & MFG. CO.**
**WORCESTER, MASS.**

## Here's a Hot One Right Off the Griddle

# Moline



## A Remarkable Car for Little Money

A car which has a lot of good points; so many, in fact, that printer's ink tells only half the story—a story well worth listening to, if you want a run for your money.

# The MOLINE Nineteen-Niner

### IS SNAPPY—RAKISH—RACY

But That's Not All—It Has: **Three-point Suspension Unit Power Plant. Lots of Power and Speed—a Hill Defier and Time Annihilator. Every Working Part Easily Accessible. Magneto when Desired**

Eastern Agents Should Investigate Before Closing 1909 Contracts

**Moline Automobile Co.** Standard Manufacturers, A. M. C. M. A. **East Moline, Ill.**

# OLDSMOBILE

## *It took ten years*

to produce the 1909 Oldsmobile—and it is doubtful if so good a car could be produced in less time. In ten years of successful motor car building we have eliminated the undesirable, perfected the experimental—and offer the result as a tried and true American car, giving the very best value for the money.

An engineer can best appreciate the motor, transmission and frame; an artist can best appreciate the grace, balance and restraint of the design...All appreciate its wonderful "roadability."

4 cyl. Touring car and Roadster, $2750
6 cyl. " " " " $4200

—"*the logical car at a logical price.*"

Details on request. A little territory open.

## OLDS MOTOR WORKS

### LANSING, MICH.

Member Association Licensed Automobile Manufacturers

Canadian Address: Oldsmobile Co. of Canada, 80 King St., E. Toronto, Canada

Do You Know?

Broken Aluminum Castings
AND
Cast Iron Cylinders
Can be perfectly repaired by the

**Oxy-Acetylene Process**

**AUTOMOBILE BUILDERS can save nearly all their defective castings and can greatly lessen cost and improve construction by the use of this process.**
**Apparatus and samples of work will be exhibited in Space 411, 412**

AUTOMOBILE SHOW
Madison Square Garden, New York
January 15 to 24, 1909

**In the meantime call or write for information**

**Davis-Bournonville Company**
**Room 1582, 90 West Street, New York City**

**General Dealers Having Operating Plants:**

CHICAGO WELDING CO., 55 W. Jackson Boulevard, Chicago, Ill.
DAVIS ACETYLENE CO., Elkhart, Ind.
AUTOGENOUS WELDING DEVICES CO., Kansas City, Mo.
THE PNEUMATIC APPLIANCE CO., Singer Building, New York
AUTOGENOUS WELDING EQUIPMENT CO., 106 Hayden Ave., Springfield, Mass.
GEORGE BRECK, 550 Grove St., San Francisco, Cal.
THE SCOBEY OXY-ACETYLENE CO., 86 Tenth St., Portland, Ore.
HENDERSON-WILLIS WELDING & CUTTING CO., Security Building, St. Louis, Mo.

# B-Line Guns on a New List

¶ On January 1, 1909, B-Line Oil and Grease Guns will be put on a new list which will undoubtedly triple their sales.

¶ These are the *all* metal guns whose perfect fit and action astonished the automobile world:—the guns with the metal plungers:—the guns that *can't* get out of order.

¶ They have never been even approached in quality or efficiency.

¶ See cut-off below.

# Improved Webster Gauge

¶ NO SOLDER. NO BOTHER.

¶ Easily applied to any auto, motorcycle or launch, in less than ten minutes, *including* the cutting of the holes.

# New Tank Cutter

¶ Will cut a perfect hole in any tank, whether round or flat, in 30 seconds.

¶ NO SOLDER. One cutter for all tanks.

## The Randall-Faichney Company

**BOSTON, MASS., U. S. A.**

........................................ CUT OFF AND MAIL TO-DAY ........................................

*The Randall-Faichney Company Auto Dept., Box 5300, Boston, Mass., U. S. A.*

KINDLY MAIL, WITHOUT CHARGE, your BOOKLET, "GUNS AND GAUGES," telling the whole story, to

..........................................................................................

DIETZ "Sterling" Lamps.
(3 Sizes.)

THE ORIGINAL

**DIETZ MOTOR CAR LAMPS**

NONE "JUST AS GOOD"

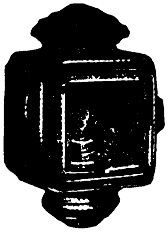
FOR

**KEROSENE OIL**

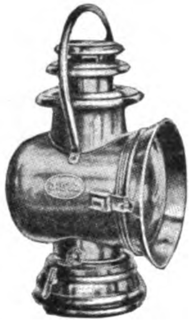
**ACETYLENE GAS**

AND

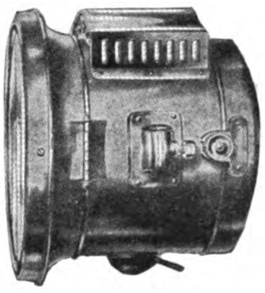
**ELECTRIC CURRENT**



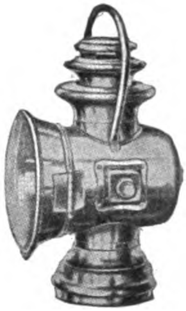
DIETZ "Excelsior" Lamp.
(Acetylene or Electric.)



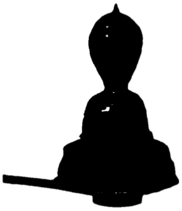
DIETZ "Ideal" Lamp.



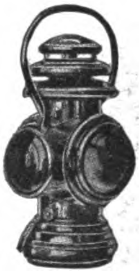
DIETZ
**Superior Headlights and Searchlights**



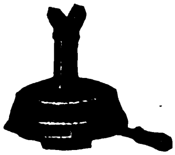
DIETZ "Royal Junior" Lamp.



DIETZ "Comet" (Interchangeable) Burner.
Fits any Dietz Oil Lamp.



DIETZ "Dainty" Tail Lamp.



DIETZ "Presto" (Interchangeable) Burner.
Fits any Dietz Oil Lamp.

## R. E. DIETZ COMPANY

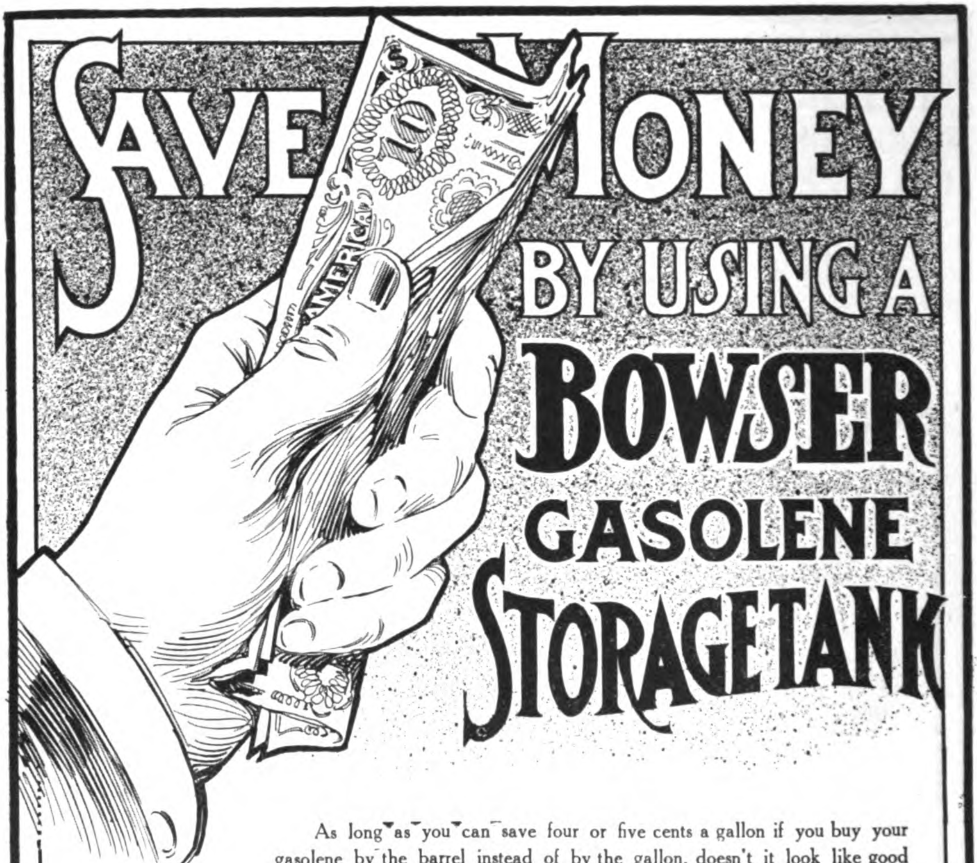
**60 LAIGHT STREET, NEW YORK, U. S. A.**

PIONEERS IN THE MOTOR LAMP INDUSTRY

*ESTABLISHED 1840* *1909 CATALOGUE ON REQUEST*

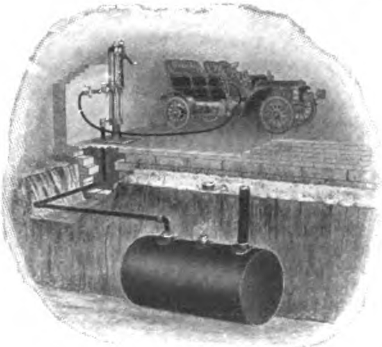
ELECTRIC HEADLIGHTS
ACETYLENE HEADLIGHTS
ACETYLENE SEARCHLIGHTS
SELF-CONTAINED (Acetylene) LAMPS
THE FAMOUS "HANDY" GENERATORS (Acetylene)
OIL, GAS AND ELECTRIC LAMPS
TAXICAB LAMPS
MARINE OIL LAMPS
MARINE SEARCHLIGHTS

*Do not fail to visit our Superb Exhibit at New York and Chicago Shows*



As long as you can save four or five cents a gallon if you buy your gasolene by the barrel instead of by the gallon, doesn't it look like good business to buy it in quantities?

You need not be afraid that it will all evaporate before you get a chance to use it. You need not fear that a gasolene explosion will destroy your garage. A Bowser outfit will take care of these things, for they are all built evaporation proof, and have never yet caused an explosion.



Cut 41—The Standard Garage Equipment

Then think of the convenience of having your gasolene right where you want it and when you want it. If it is necessary to fill a car, just attach the hose to the reservoir and a few strokes of the pump handle do the work. The car is filled, the exact amount of gasolene pumped is indicated, and the gasolene has never been exposed to the air. This means that all danger is eliminated and that the gasolene is absolutely free from the dust and grit which causes so much trouble with carburetors.

Write for our Catalog T. It explains the Bowser System fully, and will give you many valuable pointers.

**S. F. BOWSER & CO., Inc., Fort Wayne, Ind.**

255 Atlantic Ave. BOSTON
50 Church St. NEW YORK
Fisher Bldg. CHICAGO
612 Howard St. SAN FRANCISCO
66-68 Frazer Ave. TORONTO

# CHALMERS-DETROIT DOINGS

TRADE PAPER EDITION

NUMBER ONE

## TWO-BEARING CRANK-SHAFTS ARE PERFECT

### Right in Design and Material, None of These Shafts Has Broken and None Will Break.

People who want to sell other cars talk about our two-bearing crank-shaft. They are anxiously watching for one to give out.

They will be disappointed.

It has been tested at the University of Michigan under eight times the load that it gets in the car.

No amount of talk against the two-bearing crank-shaft by persons whose self interest leads them into prejudice can offset the fact that this shaft withstands every test of experiment and use. Some people may have a theory that our two-bearing crank-shafts will break. But the fact is, they don't—and won't. 1000 of these crank-shafts are in use and are giving entire satisfaction. Not one has broken.

You can't break them. We will let any buyer write his own guarantee on our two-bearing crank-shaft.

Two bearings cannot get out of line. More than two are kept in line only with difficulty.

## 20,800 MILES IN 100 DAYS

### A Chalmers-Detroit "30" 1909 Model Did it; 208 Miles a Day for 100 Consecutive Days—No Other Automobile ever Ran so Far in the Same Length of Time.

### IT IS A WORLD'S RECORD

On August 9, 1908, we assigned to one of our 1909 model "30's" the stupendous task of going 208 miles a day for 100 consecutive days.

There were many who said the task was too big. They did not know the car that had undertaken the task.

On Tuesday, November 17, 1908, the now famous car completed its one hundredth Double Century run in as many days, thereby establishing a record that has never been equalled and probably will never be surpassed.

The "20,000 Mile Car" made its long journey without faltering at any stage. There were no mechanical troubles.

The total amount of gasoline consumed on the run was 1,151 gallons.

This makes an average of 18.06 miles per gallon of gasoline—a splendid showing.

The "20,000 Mile Car" was the second of our 1909 "30" cars to be finished.

It had been driven for more than 6,000 miles through middle western states before it undertook the 20,000 mile test.

It has, therefore, been driven further than the average automobile would be driven in five seasons.

Five years of service in a $1500 car!

## OVER 1000 '09 MODELS NOW IN USE

### People Who Pay for Motor Cars and Use Them Are Best Judges of Their Worth.

Our 1909 model "30" was ready for delivery July 1, 1908. Since then we have sold and delivered more than 1000 of these cars. They are now in daily use on the streets and roads of this country.

The time for argument is past. We invite you now to judge this car by performance.

More than 1000 owners—everywhere—are now running these cars. They'll say what the cars can do.

Praise or attack are immaterial now. Facts speak louder than theories when a thousand cars are running.

A score of great records—both for speed and endurance—have already been won by our "30."

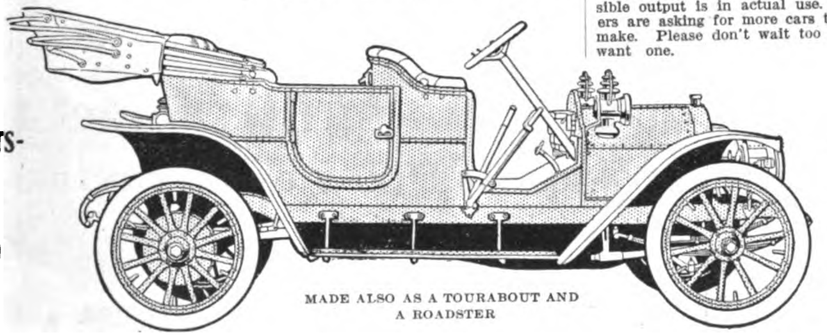
Performance is the only true test of a car's worth. We want you to judge our cars by the proved standard of use.

The users of motor cars are the supreme court of motordom and we are pleased to have you carry our case before that court.

Last June when we first announced this astounding car, the facts seemed too good to be true. One could scarcely believe that such a car—the most up-to-date car on the market—could be sold for $1500.

Now more than one-third of our possible output is in actual use. Our dealers are asking for more cars than we can make. Please don't wait too long if you want one.

**Chalmers-Detroit "30" $1500**



MADE ALSO AS A TOURABOUT AND A ROADSTER

**"It's a Good Car"**

## FOUR CYLINDERS CAST EN BLOC

Rivals who still cling to separate cylinders denounce the fact that ours are cast together.

Many of the most successful foreign makers have used the en bloc cylinders for years in their light cars. They are used in the Hotchkiss, Mors, Fiat, Unic, Beatrix, Delahaye, Aster and other great European cars. A number of American builders are now following our lead in cylinder casting for light cars.

Separate cylinders waste room—make the short hood impossible, and every extra inch in the hood means an inch less in the tonneau.

Cylinders en bloc are light and compact. They are rigid. They allow ample water space and aid circulation.

But rivals say, "Think of the cost of replacement." That's too rare to consider. But we will sell you four new cylinders, if you ever need them, for $35. That answers all.

On Election Day, November 3rd, more than 100 Chalmers-Detroit "30" cars in all sections of the United States covered each a distance of 200 miles without a stop of the engine. The average of all the cars in this Election Day Non-Stop run was 18.2 miles to one gallon of gasoline, a very remarkable showing considering that it is an average for the entire country.

In the Jericho Sweepstakes held on the Long Island Motor Parkway, Chalmers-Detroit "30's" won first and second, lapping all other contestants and averaging 48 miles an hour for 150 miles.

Our "Forty" Special Speed Roadster deserves an unqualified statement, so we say it is the classiest roadster made at any price, $2750.

In the International Light Car Road Race at Savannah, the "30" performed consistently, finishing third and averaging 51 miles an hour for 200 miles.

The "30" has many victories in hill climbs and endurance contests to its credit—too many to record here

We make the "Forty" also as a touring car and runabout.

You will find all of our cars fully described in the catalog "C" we will send you on request.

## Chalmers-Detroit Motor Company

DETROIT, MICH., U. S. A.

# WHY? Do water-cooled cars predominate?

# BECAUSE--

**Since the inception of the industry, 98% of the manufacturers have proceeded along the line of least resistance. ¶ A few of us have maintained the courage of our convictions in face of tremendous odds, and by laborious effort attained their fulfillment.**

**We give you to-day in the "Cameron," an air-cooled motor which is ABSOLUTELY SUPERIOR to the water-cooled type under any conceivable condition. Water-cooled motors do not and cannot cool as successfully.**

**We state here unreservedly that "Cameron" Motors are more efficient and economical under any condition whatsoever than any motors built of same piston displacement.**

**We are taking and shall continue to take every opportunity within our reach to demonstrate this truth in competition.**

**The following table of variations in time between fastest and slowest laps (23.46 miles to each lap) in Sweepstakes events over the Vanderbilt Course, October 10th, is certainly an important verification of our claims, and means that our**

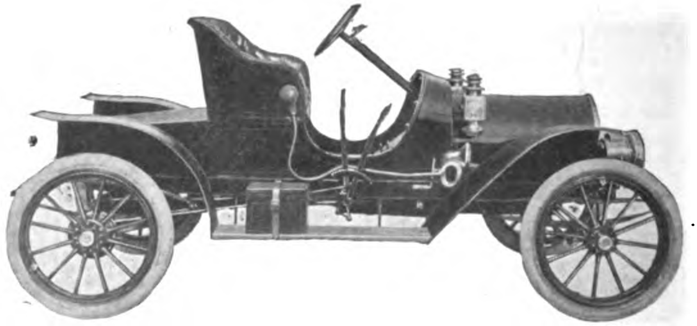
**COOLING SYSTEM, IGNITION, CARBURATION, LUBRICATION, WEIGHT DISTRIBUTION, TIRE PROPORTIONS and CONTROL were Absolutely Perfect**

| | | |
|---|---|---|
| MODEL 15 | 4-cylinder, 2-passenger "Featherweight Flyer" | $1000 |
| MODEL 16 | 4-cylinder, 5-passenger Touring Car | 1100 |
| MODEL 11 | 6-cylinder, Touring Car, Roadster, Runabout | 1500 |

| | VARIATION |
|---|---|
| Cameron | .11 |
| Rainier | 1.39 |
| Itala | 2.11 |
| Renault | 2.20 |
| Mitchell | 2.58 |
| Isotta | 3.58 |
| Sharp | 4.13 |
| Mitchell | 6.08 |
| Buick | 6.25 |
| Lancia | 7.00 |
| Simplex | 11.35 |
| Chalmers-D. | 11.45 |
| Mitchell | 12.33 |
| Buick | 12.37 |
| Allen-K. | 13.00 |
| Chadwick | 14.38 |
| Cadillac | 18.14 |
| Maxwell | 18.36 |
| Knox | 23.24 |
| Stoddard-D. | 27.33 |

## 20-24 H. P. $900 Model 14

**with HIGH TENSION MAGNETO**



**SPECIFICATIONS: Motor**—Cameron air-cooled, 4 cylinder, 20-24 H.P., 3¾ x 3½. **Transmission**—Cameron patent selective type, 3 speeds forward; direct drive on all speeds. **Ignition**—"Remy" dual system, including high tension magneto and battery. **Wheel Base**—96 in. **Tread**—Standard (60 in. tread for Southern roads when specified). **Equipment**—Two searchlights and generator, side lamps, tail light, horn, complete tool kits. **Price, with single rumble, $950.**

**CAMERON MOTOR COMPANY (SELLING AGENTS)**
**CAMERON BUILDING—231 West 54th St., NEW YORK CITY**

# The Holley Carburetor

## MODEL W

(Patented May 12, 1908, No. 887370)

## The simplest and most flexible automatic carburetor in the world

In the year that this carburetor has been before the public, it has been acknowledged to be the only device of its kind by which a perfect mixture is given throughout the full range of engine speeds, without dependence on air valves or delicate springs, and with but one thing for the user to adjust. Its unique position as the "Single-Adjustment Carburetor" has won it special recognition as the easiest carburetor for the novice to handle. Its extraordinary flexibility, quick response and efficiency at low as well as high speeds make it a favorite with motorists who appreciate perfect engine control under all conditions.

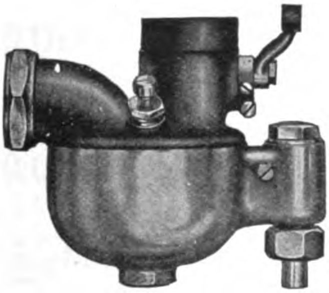
The extreme simplicity of the Holley Model W and the large numbers in which it is being manufactured, enable us for the coming season to offer it at prices which will appeal to every motorist whose engine performance is inferior to what he has a right to expect. At the prices below a satisfactory carburetor costs less than the gasoline wasted by a poor one.

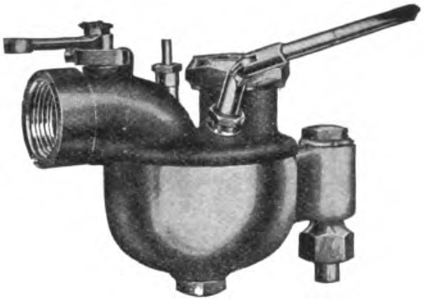
**Regular Top or Side Outlet Models:**

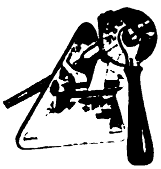
| | |
|---|---|
| ¾ inch | —$7.50 |
| 1 inch | — 7.50 |
| 1¼ inches | — 8.00 |
| 1½ inches | — 9.00 |

**With Universal Joint and Dial Adjustment—Top or Side Outlet:**

| | |
|---|---|
| ¾ inch | —$10.50 |
| 1 inch | — 10.50 |
| 1¼ inches | — 11.00 |
| 1½ inches | — 12.00 |







### A New Feature is the DASHBOARD ADJUSTMENT

of the needle valve. This needle valve is the only thing the user has to adjust, the float level being set at the factory. At its upper end is a universal joint, from which a rod extends through the dashboard to a dial and regulating needle. A spring ratchet holds the dial where set, and a hinge permits it to accommodate itself to the angle of the rod. This attachment enables the user to adjust his carburetor under running conditions—a matter of an instant,—whereas otherwise he might experiment repeatedly. It also makes it possible to adjust for day-to-day variations in humidity, temperature, and grade of fuel, as well as to start on a rich mixture and cut down when the engine is warmed up. A special adjustment for hills and sand is also possible.

## HOLLEY BROTHERS COMPANY, Detroit, Mich.

**SELLING AGENTS**

**NEW YORK CITY**—New York Sporting Goods Co., 17 Warren St.
**PACIFIC COAST**—San Francisco, Cal., Geo. P. Moore Co.; Los Angeles, Cal., Geo. P. Moore Co.; Oakland, Cal., Geo. P. Moore Co
**NEW ENGLAND**—Hartford, Conn., Post & Lester Co.; Boston, Mass., Post & Lester Co.

# When You Visit the Palace Show

be sure

to examine these Maxwells:

| | | |
|---|---|---|
| MAXWELL | Junior Standard American Runabout, 2-cylinder, 10 H. P. - - | $500.00 |
| MAXWELL | 2-cylinder, 14 H. P. Runabout, Model LD, Magneto, Top, Gas Lamps, Generator - - - - - - | $825.00 |
| MAXWELL | 2-cylinder, 20 H. P. "Doctor," Magneto, Top, Gas Lamps, Generator | $1350.00 |
| MAXWELL | 2-cylinder, 20 H. P. Touring Car, Model HD, Magneto, Top, Gas Lamps, Generator - - - - | $1450.00 |
| MAXWELL | 4-cylinder, 30 H. P. Touring Car, Magneto, Gas Lamps, Generator | $1750.00 |
| MAXWELL | 4-cylinder, 30 H. P. Gentleman's Roadster, Magneto, Gas Lamps, Generator - - - - - - | $1750.00 |
| MAXWELL | 2-cylinder, 20 H. P. Delivery Wagon, Magneto and full equipment | $1400.00 |

**Maxwell-Briscoe Motor Company**

**BOX 110, TARRYTOWN, N. Y.**

**Factories, TARRYTOWN, N. Y. NEW CASTLE, IND. PAWTUCKET, R. I.**

# When You Visit the Palace Show

be sure

to ask for an explanation of the exclusive Maxwell features, such as:

Thermo-Syphon Cooling System
Three Point Suspension
Unit Construction
Multiple-Disc Clutch
Metal Bodies

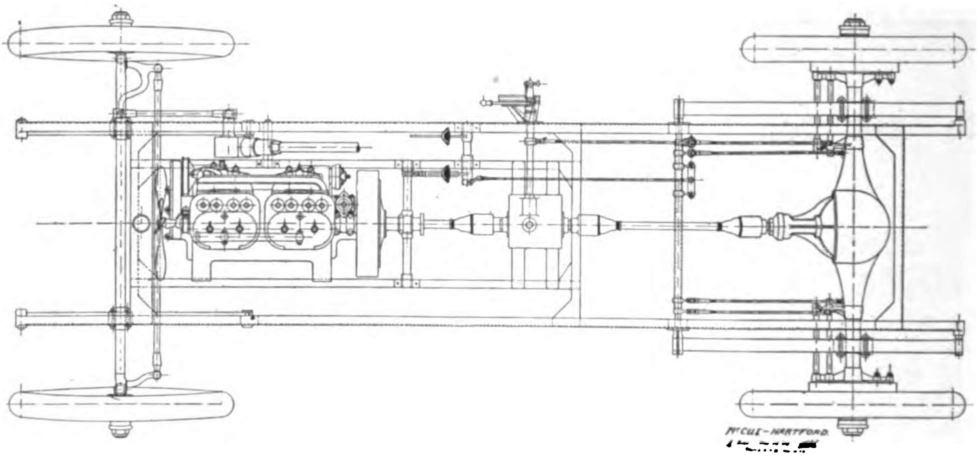
Then let us talk to you about our **dealers' proposition** which will show you that there are

Superior Service
More Money
Quicker Profits
Greater Sales
Greater All-around Satisfaction

In selling Maxwell cars than in the sale of any other car.

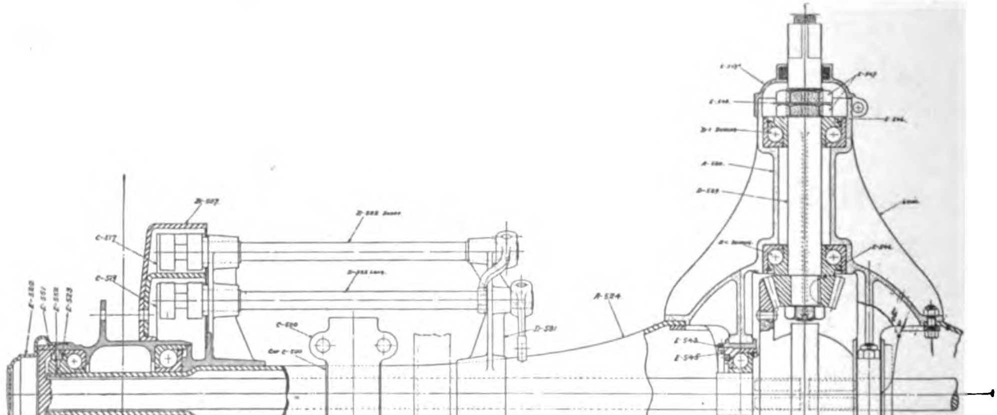
**Maxwell-Briscoe Motor Company**
**BOX 110, TARRYTOWN, N. Y.**
**Factories, TARRYTOWN, N. Y. NEW CASTLE, IND. PAWTUCKET, R. I.**

# THE McCUE COMPANY



## SIMPLE CONSTRUCTION

Complete Chassis ready for body or with body, Floating Type Rear Axles, I-Beam Front Axles, Clutches, Spring Hangers, Foot Pedals, Connecting Rods, Brake Rods, Brake Levers, Equalizers, and other small forgings.



**It's Good. Note Carefully!**

**THE McCUE COMPANY, Hartford, Connecticut**

The Overland

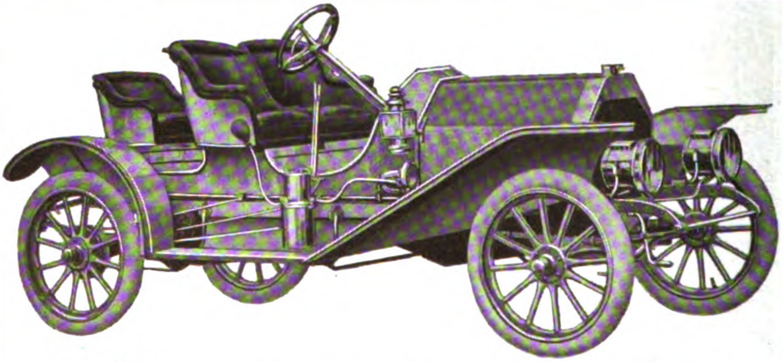
For Reliability
For Simplicity
For Comfort
For Noiselessness
For Ease in
Operation and
For Value

**The Overland is unexcelled**

**Write for Catalog to**

Overland Automobile Co.
Indianapolis :: :: :: Indiana

# The Overland



**Model 30 - - - - - - $1250**
**With Double Bucket Seats in rear - $1300**

**4 cylinder 30 H. P.**
**108" Wheel Base 32 x 3½ Q. D. Tires**
**Magneto and Headlights**

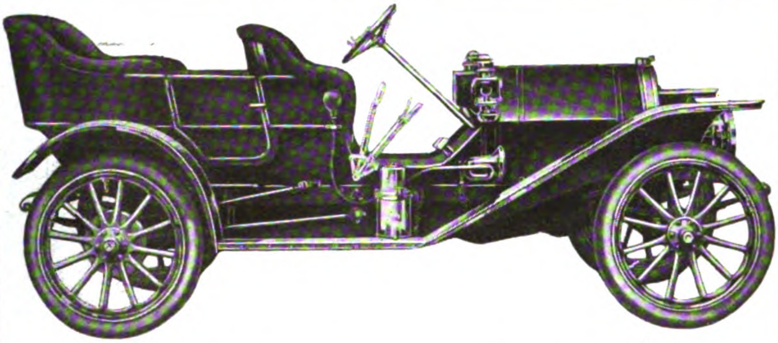
**Unquestionably the best value ever placed on the American market**

---

**Write for Catalog to**

Overland Automobile Co.
Indianapolis :: :: :: Indiana

# The Overland



**Model 32 - - - - - $1500**

**4 cylinder 30 H. P.**
**110" Wheel Base 34 x 3½ Q. D. Tires**
**3-speed Selective Transmission, Magneto, Headlights and Full Equipment**

**This model can be furnished with Roadster or Toy Tonneau body in addition to the 5-passenger Touring Car illustrated above.**

**Write for Catalog and Specifications of The WILLYS-SIX Cylinder at $2000.00.**

---

Overland Automobile Co.
Indianapolis :: :: :: Indiana

The Car With Class

The Marion Flyer

$1850

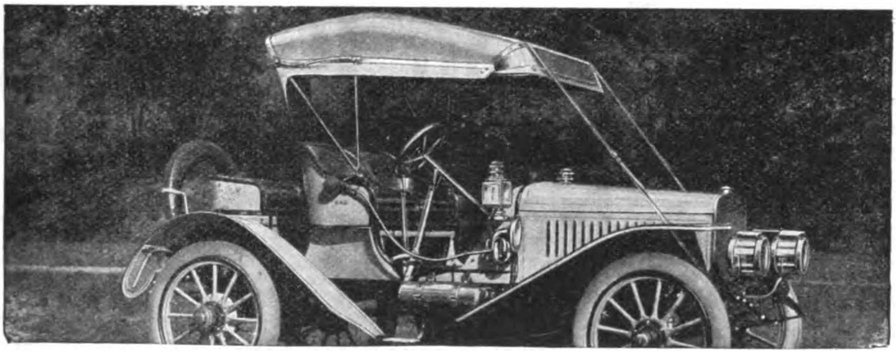
Equipped with Detachable Toy Tonneau or 5 passenger Touring Car body.

1 H. P. to every 52 lbs. of actual weight.

Don't fail to see this car at the Grand Central Palace, December 31--January 8.

Write for Specifications to
Marion Motor Car Sales Co.
Indianapolis - - - - Indiana

# Col. Sprague's
# Auto Tops and Fronts



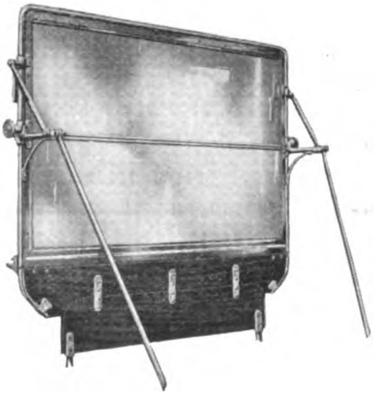
No. 36 Runabout Top

¶ If you see them at the Auto Show, you will say they are the best that can be made. We will be at the Palace and Garden Auto Shows in New York, and the Chicago Auto Show. You won't see these shows right if you don't see our Tops and Fronts. We've got some new ones. Our new "Leader" is a corker, in price and quality.

**All with fine finish**

**All with solid Brass fittings**

**All that anyone wants**



**Always the best**

**Always easy to clean**

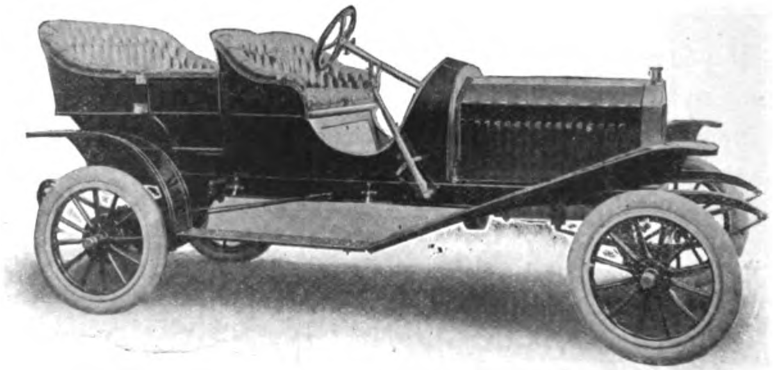
**Always silent**

**Always right**

ASK FOR OUR SPLENDID NEW 1909 CATALOGUE AND PRICE LIST

## The Sprague Umbrella Co., Norwalk, Ohio, U.S.A.

# Each Model a Leader in Its Class



The Lambert Car is a **good** automobile at a low price—not for one moment to be confused with **cheap** gear-driven cars.

The lower cost of the **more** efficient, simple Lambert friction transmission is what enables us to make a far better car than **any** manufacturer of gear-transmission cars can make for the same money.

In the Lambert Car, there's a full dollar's worth of automobile value for every dollar of the price—and more, too, if judged by the ordinary standards.

We said the Lambert friction drive is more efficient than gear transmission. It is. It transmits **under all conditions** a higher percentage of the power generated than any type of gear transmission. It is the simplest form of transmission. It eliminates gear troubles, and gear expense. It gives to the Lambert Car a smooth-running quality found in few cars.

Each Lambert model is distinguished by **other** simplicity, big-value features. **Each** is a leader in its class.

# We Want Lambert Representatives

The demand for automobiles at a low price is unmistakable.

The agent who represents a **good** low-priced car—the Lambert —will get the cream of the business.

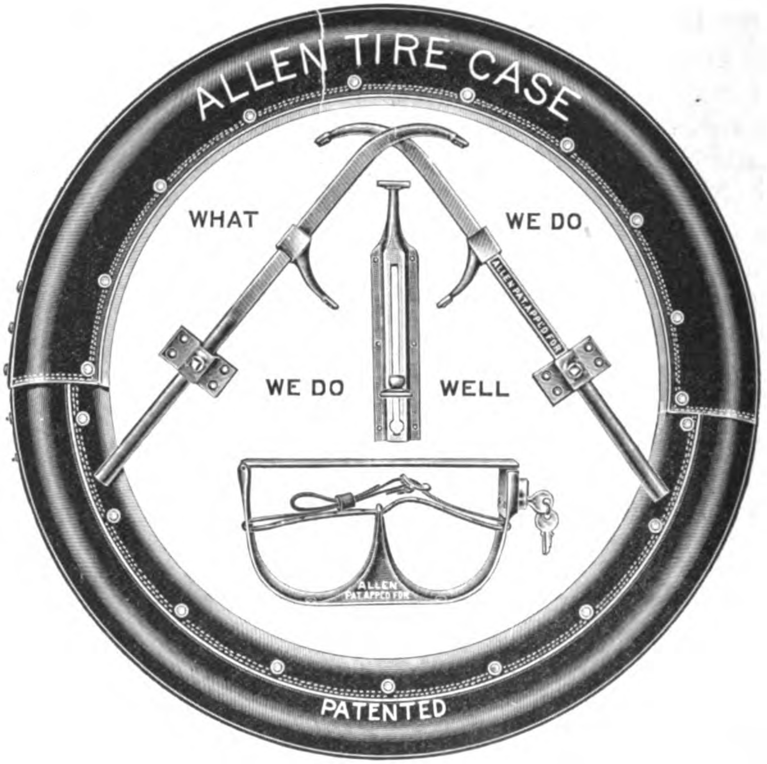
Lambert cars, friction driven, have the power, the speed, the endurance, the snappy style, the finish, of cars that cost half again as much.

In all territory now unoccupied we want representatives for the Lambert Car. We have an unusually attractive offer to make to the right kind of men who will take up our proposition and look after our interests. We want men who appreciate and will **talk** the Lambert friction drive. Men who know enough about automobiles to recognize the fact that the Lambert Car,—each of our six models, —is the biggest value on the market at the price.

If you would be interested in taking up the agency question with us, write at once for full details of our proposition. In writing, you will please state what cars you are now handling and your facilities for representing the Lambert. Address—

## BUCKEYE MANUFACTURING CO.

**1801 Columbus Ave., Anderson, Ind.**


ALLEN TIRE CASE
WHAT
WE DO
WE DO
WELL
ALLEN PAT. APPD FOR
ALLEN PAT. APPD FOR
PATENTED

# ALLEN TIRE COVERS

**The Original Button Kind—Ask for them by Name**

We use Enamel DUCK—Not drill. Covers for all makes of Demountable Rims and Spare Wheels

# ALLEN TIRE LOCKS

NONE BETTER MADE

# ALLEN TIRE HOLDERS

ADJUSTABLE—DETACHABLE

---

## The Allen Auto Specialty Co.

**MANUFACTURERS**

**1931 Broadway, New York** **Phone, 5346 Col.**

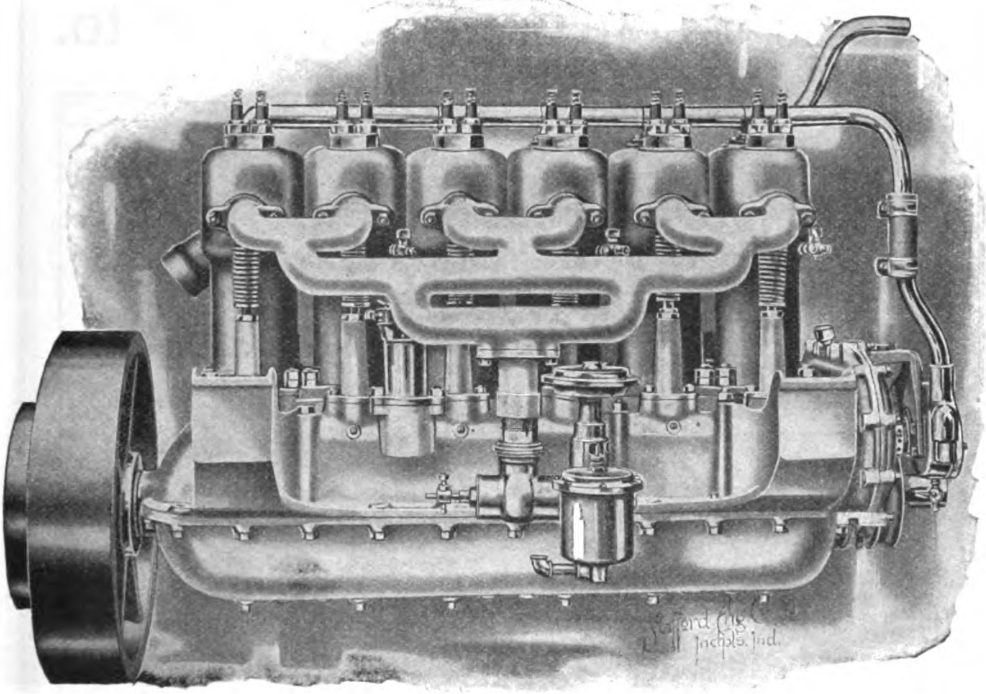
**WE WILL EXHIBIT AT BOTH NEW YORK SHOWS**

# WARNING

## NOTICE TO MANUFACTURERS OF EXPLOSION ENGINES USED FOR ANY PURPOSE

I am the owner of the Letters Patent of United States No. 617,806, granted to F. E. Canda, January 17, 1899, for electric Igniter for Explosion Engines, and Letters Patent No. 905,625, granted to Elmer Apperson, December 1, 1908, for Improvements in Explosion Engines.

Briefly stated, these patents cover broadly the use of two or more separate electric igniting devices, provided with separate circuits and means for throwing the igniting devices into or out of action simultaneously or independently; as well as covering the use of two or more spark plugs or sparking points having electrical connection with a magneto and battery with means of throwing the spark plugs or points into or out of operation.

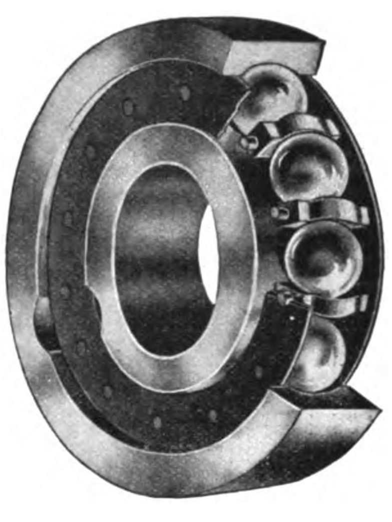


**MOTOR illustrating APPERSON system of IGNITION under PATENTS—617,806 and 905,625**

All parties now using or desiring to use this system of ignition are invited to negotiate with me. I have no desire to unnecessarily embarrass anyone, but infringers on my patents will be legally and vigorously prosecuted.

**Elmer Apperson,** care of **Apperson Bros. Automobile Co.**

**KOKOMO, INDIANA**

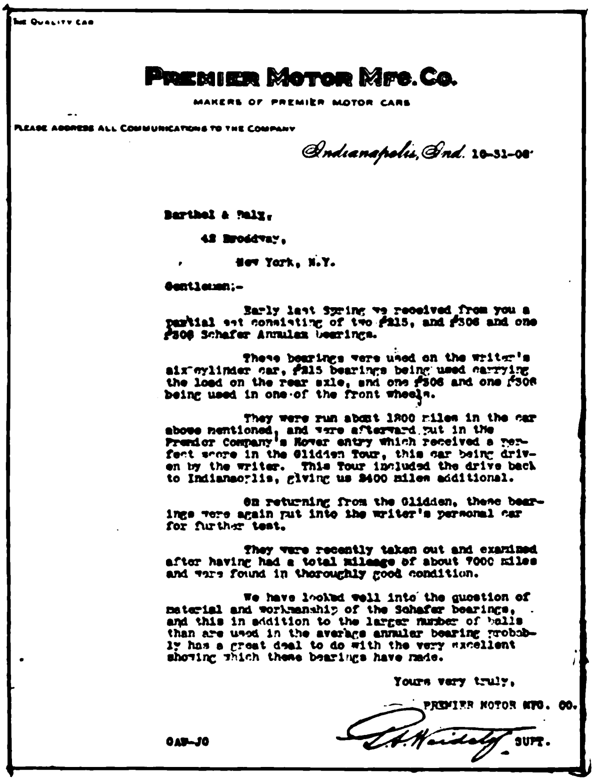


# SCHAFER BEARINGS

(MADE IN GERMANY)

are warranted to stand the shocks & strains a bearing is subjected to.

What Users of Schafer Say



THE QUALITY CAR

**PREMIER MOTOR MFG. CO.**

MAKERS OF PREMIER MOTOR CARS

PLEASE ADDRESS ALL COMMUNICATIONS TO THE COMPANY

*Indianapolis, Ind.* 10-31-08

Barthel & Daly,
42 Broadway,
New York, N.Y.

Gentlemen:-

Early last Spring we received from you a partial set consisting of two #215, and #306 and one #308 Schafer Annular bearings.

These bearings were used on the writer's six-cylinder car, #215 bearings being used carrying the load on the rear axle, and one #306 and one #308 being used in one of the front wheels.

They were run about 1800 miles in the car above mentioned, and were afterward put in the Premier Company's Rover entry which received a perfect score in the Glidden Tour, this car being driven by the writer. This Tour included the drive back to Indianapolis, giving us 2400 miles additional.

On returning from the Glidden, these bearings were again put into the writer's personal car for further test.

They were recently taken out and examined after having had a total mileage of about 7000 miles and were found in thoroughly good condition.

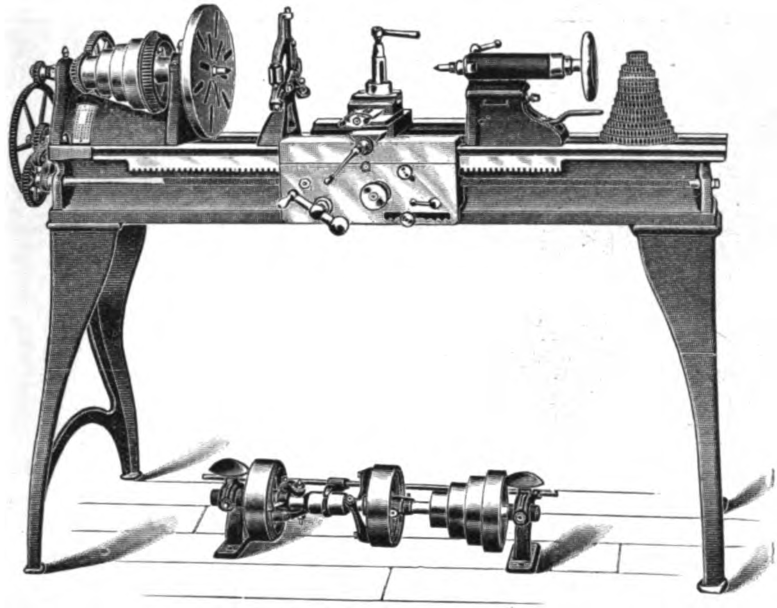
We have looked well into the question of material and workmanship of the Schafer bearings, and this in addition to the larger number of balls than are used in the average annular bearing probably has a great deal to do with the very excellent showing which these bearings have made.

Yours very truly,

PREMIER MOTOR MFG. CO.

GAW-JO G. A. Weidely SUPT.

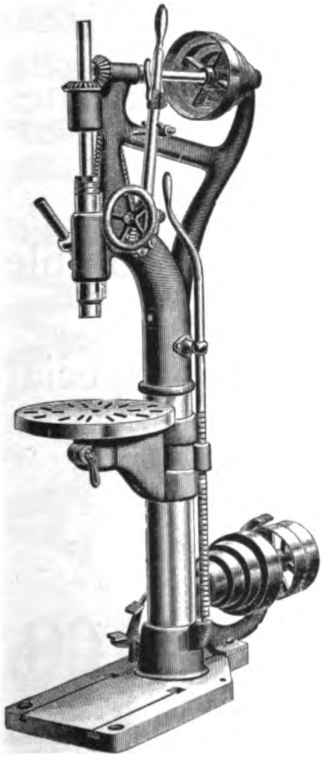
**BARTHEL & DALY, 42 Broadway, New York City**



**No. 13 Lathe 13" Swing Compound Rest, Automatic Cross Feed, and Counter 5 ft. Bed List, $167.00**

| | |
|---|---|
| **Same Lathe, 6 ft. Bed List** | **$177.00** |
| **Same Lathe, 7 ft. Bed List** | **187.00** |
| **Same Lathe, 8 ft. Bed List** | **197.00** |
| **Same Lathe, 10 ft. Bed List** | **217.00** |

**RAISING BLOCKS to swing 18 inches**
**$15.00 extra**



*The*

# "BARNES"

## W. F. & John Barnes Co.

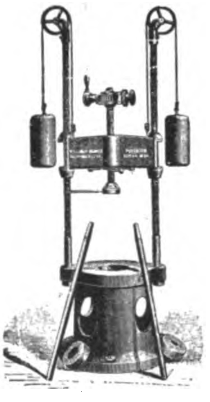
**204 RUBY STREET**
**ROCKFORD, ILL.**

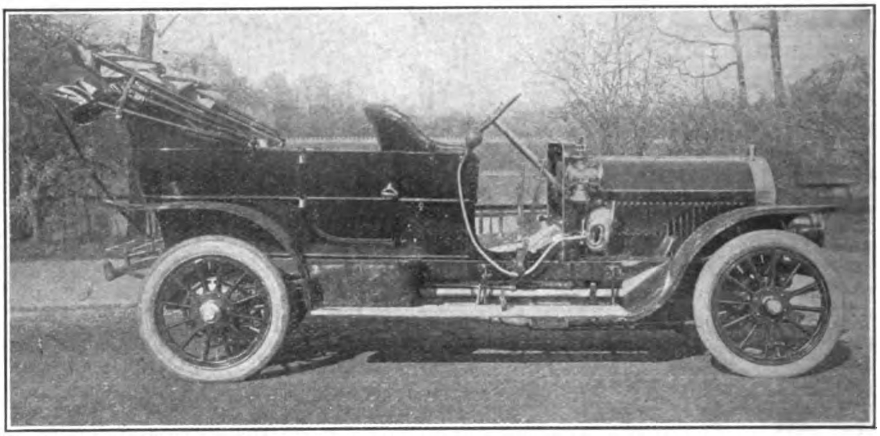
We also make Drills
8 to 50" Swing

⁂

Arbor Presses for straightening shafts, etc.

| | |
|---|---|
| No. 1 Arbor Press, | $ 65.00 |
| No. 2 Arbor Press, | 100.00 |
| No. 3 Arbor Press, | 125.00 |





**Frontenac Automobiles**

Runabout, Touring and Limousine Bodies

**FOR IMMEDIATE DELIVERY**

Simple and quiet in operation, Durable and Reliable.

Write for information regarding special features and prices for 1909 models. Also—

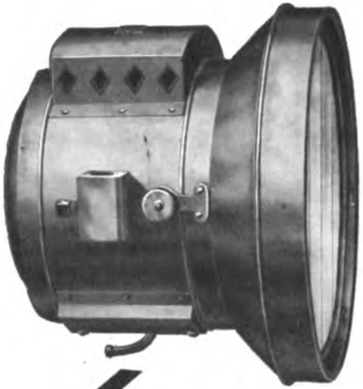
Gasoline Commercial Trucks
of 1, 3 and 5 Ton Capacity.

**ABENDROTH & ROOT MFG. CO.**

322 Fifth Ave., New York. Works, Newburgh, N. Y.

# '09 ATWOOD-CASTLE '09

# QUALITY LAMPS

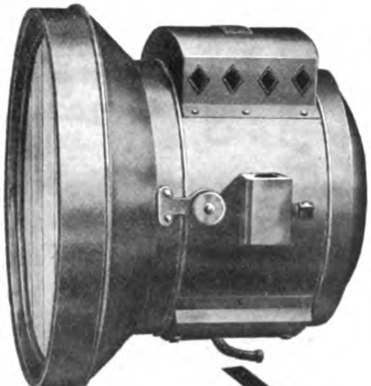


Your interest and ours are identical, be you an automobile manufacturer, supply dealer or lamp user. YOU WANT THE BEST LAMPS YOU CAN GET in order to insure perfect lighting service—WE MUST GIVE THE BEST LAMPS THAT CAN BE MADE in order to protect our reputation and hold your trade. That is exactly what ATWOOD-CASTLE lamps do—guarantee the maximum quality and efficiency with minimum investment cost.

Our line is being constantly improved and enlarged and comprises models to meet every possible lighting requirement, each one of which is distinguished by the sterling qualities that have made "ATWOOD-CASTLE" lamps the standard of excellence for nearly half a century.

The recent acquisition to our Company of Mr. F. E. Castle (probably one of the best informed lamp men in this country), together with two more world famous designers, insures for 1909 a still further betterment of our already superior output.

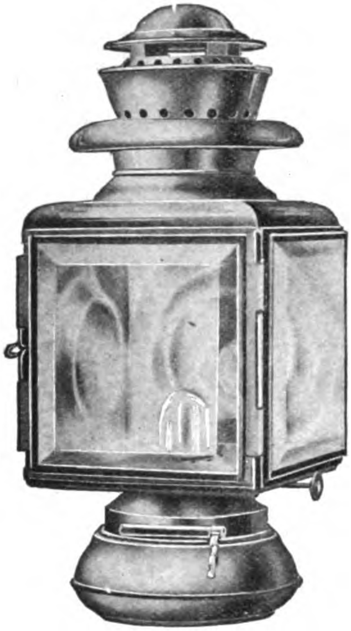
Our large factory facilities enable us to handle any demand promptly, in special design or otherwise. We solicit your patronage with the assurance that we will furnish you lamps of the highest quality obtainable.



## ATWOOD-CASTLE COMPANY

**AMESBURY, MASS.**

**WESTERN OFFICE: 247 Jefferson Ave., Detroit, Mich.**



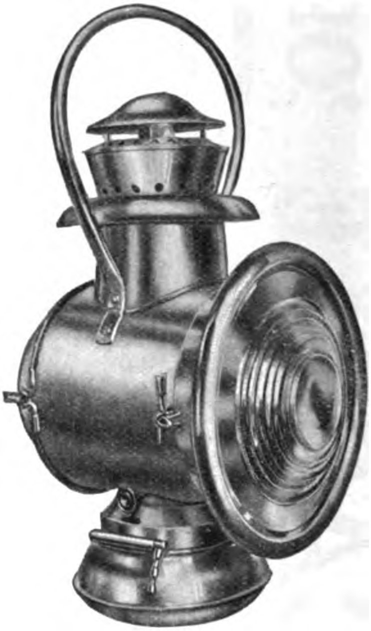
**Ham's Limousine**

Our
Handsome
New
Catalogue
for
1909
Is Now
Ready

We Would
Like
to Send
You One

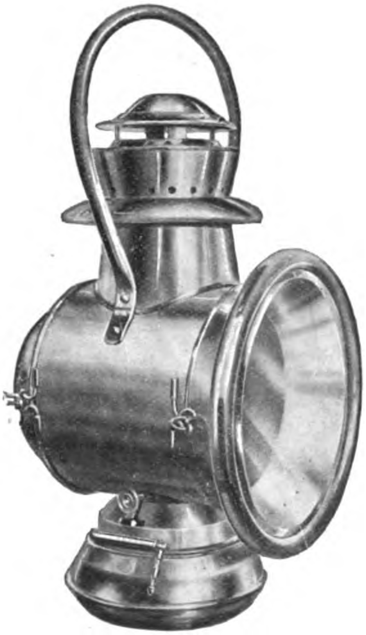
Write
Today

Address
"Dept. D"



**Ham's Tourist**

# Ham's Cold Blast Auto Lamps Are Made in Rochester, N. Y.

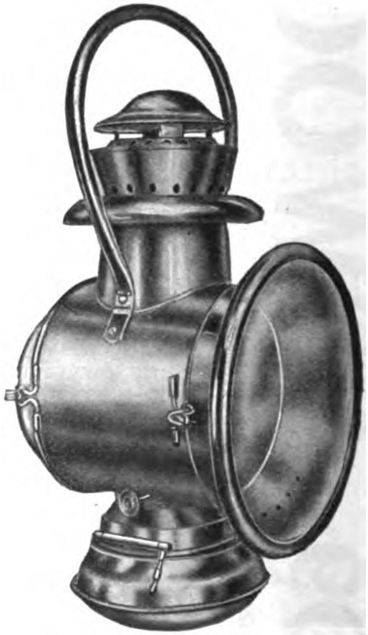


**Ham's Reliance**

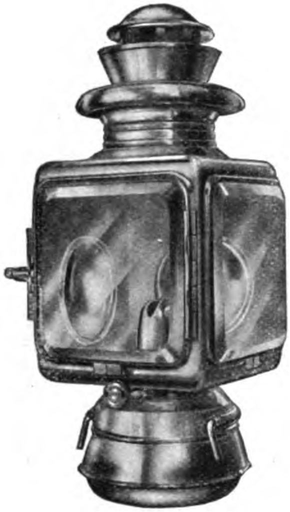
Some of
The Best
Cars
in the
Country
are Being
Equipped
with
HAM'S
LAMPS

Why Not
Yours?

You can
Get Them
if you Insist

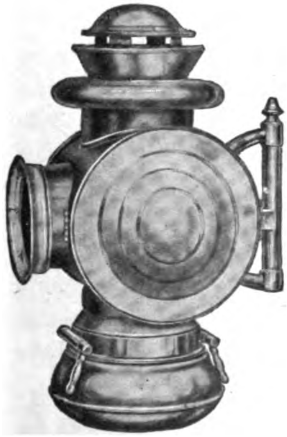


**Ham's Corona**



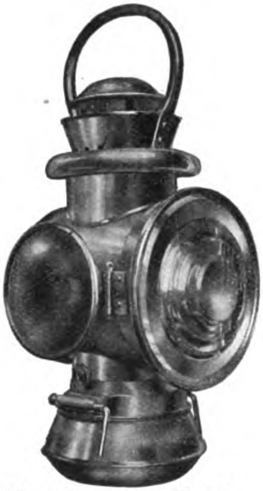
**Ham's Coupe**

Ham's Lamps are made very strong, of the Highest Grade Heavy Gauge Brass and are reinforced with Steel Plates to take the strain on the brackets. Honest Material, Honest Workmanship and Superior Burning Qualities have made Ham's "Cold Blast" Lamps Famous.



**Ham's Vigilant Tail and Inspector Lamp**

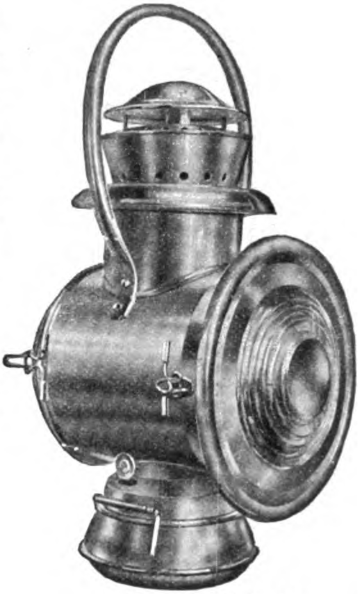
Ham's "Cold Blast" are without a doubt the finest burning Automobile Lamps on the market. They give a Clear, White, Steady Light and are Guaranteed not to Blow or Jar out.



**Ham's Mars Tail Lamp**

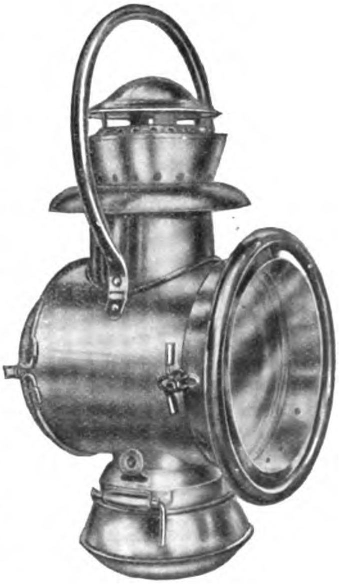
*See our Exhibit at Grand Central Palace Show, "Space 166, Section U," opening on New Year's Eve. Also Madison Square Garden Show, opening Jan. 16th.*

**C. T. HAM MFG. CO.**
**ROCHESTER, N. Y.**



**Ham's Meteor**

We have added several new and beautiful designs to our already complete line for 1909 and it will pay you to look them over and get our prices before placing your orders. We are sure we can please you.



**Ham's Star**

*We Manufacture*

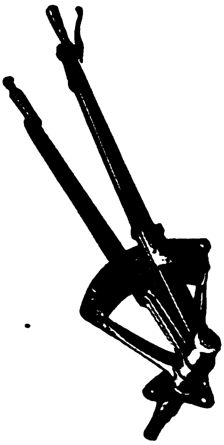
WITHOUT
DOUBT THE

BEST
TRANSMISSION
AXLE

***in America***

**¶ Why not give us an opportunity to prove this?**

*Covert Motor Vehicle Co.*
LOCKPORT : : : : NEW YORK

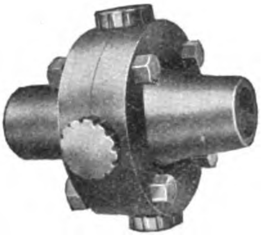


# B. T. K. PARTS

**Manufactured by**

## Auto Parts Manufacturing Company

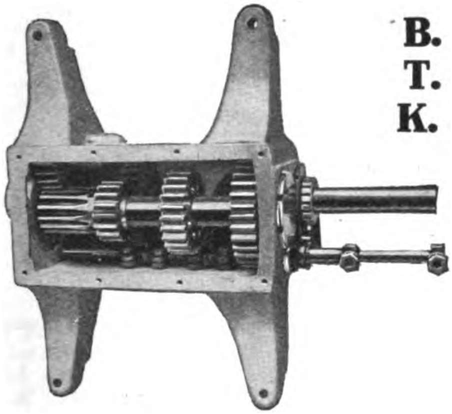
The best automobile parts for the man who is particular. Our aim is to make high class work in every particular. We make special parts according to your blue prints, and would be pleased to have you submit same for quotations.



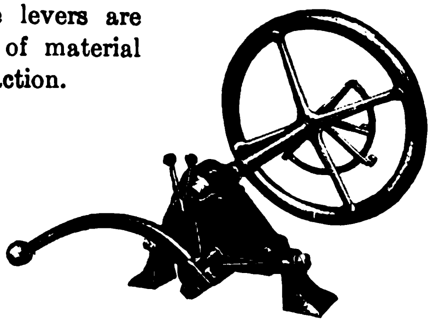
## B. T. K. JOINTS

Can't be beat, and will stand up under any load, are dust and fool proof, self oiling, and furnished for shafts in sizes from ⅞ to 1½".

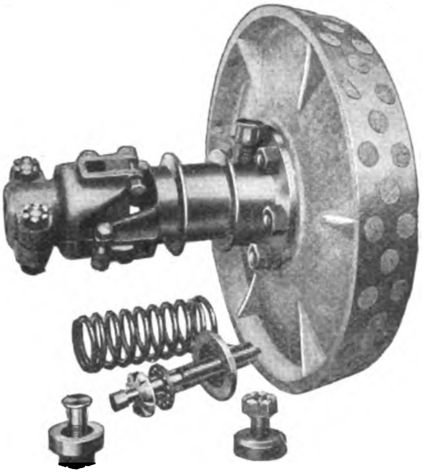
Our progressive and selective side levers are made of drop forgings and best grade of material throughout, and are giving entire satisfaction.



**B.**
**T.**
**K.**



Our worm steering device for heavy cars and our light steering device for light cars and high wheel autos are both durable and what the trade demands.



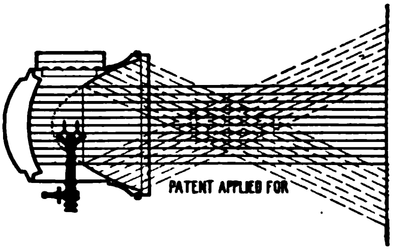
We are making both selective and progressive type sliding gear transmissions, of high class workmanship and material throughout, furnished either leather or bronze face, with or without cork inserts.

We solicit your inquiries, and would be pleased to quote prices on application. Write for price-list and catalogue. For further information address

## Auto Parts Manufacturing Company
MUNCIE, IND.

The Neverout
TRADE MARK

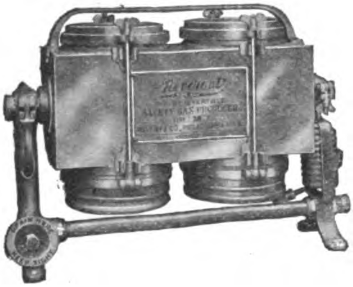
# Double Focus Searchlight



**TWICE AS
POWERFUL
AS THE
OLD-FASHIONED
KIND.**

SEE
Neverout
EXHIBIT
MADISON SQUARE GARDEN
SHOW
N. Y.

The Neverout
TRADE MARK



# Patent Invertible Gas Producer

**Generates the purest Acetylene Gas for lighting Autos and Motor Boats. Absolutely overcomes generator troubles. Makes the old style gas tank a thing of the past.**

*Write today.*

**ROSE MANUFACTURING CO.**

**MAIN OFFICES, 911 ARCH STREET :: :: PHILADELPHIA, U. S. A.**

# CYCLE AND AUTOMOBILE TRADE JOURNAL

Vol. XIII, No. 7 PHILADELPHIA JANUARY 1, 1909

## DECEMBER EDITION 23,215

| | |
|---|---|
| 15,810 | Copies mailed at pound rates. |
| 7,106 | Copies delivered to News Company. |
| 570 | Copies to Philadelphia and foreign, etc., under stamps. |
| 250 | Copies held in reserve. |
| 23,736 | |
| 521 | Back numbers sent out. |
| 23,215 | Total copies of December edition. Of these |
| 13,704 | Were paid subscriptions. |
| 7,106 | Delivered to News Company. |
| 20,810 | |
| 882 | Returned by News Company, to December 19, 1908. |
| 19,928 | Net total paid. |

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the December issue was 23,215.

Of these, 19,752 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 20 ounces, representing 15,810 copies, and 521 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

## COMING EVENTS

### American.

December 31-January 7—A. M. C. M. A. Annual Automobile Show at Grand Central Palace, New York City.

1909.

January 1—Cycle and Automobile Trade Journal Ninth Annual Buyers' Guide Special, circulated during New York show.

January 1-2—Quaker City Motor Club's third annual endurance run from Philadelphia to Wilkes-Barre and return.

January 16-23—Annual Automobile Show in Madison Square Garden, under auspices of Association of Licensed Automobile Manufacturers, 7 E. 42d St., New York City.

January 27-Feb. 3—Annual Automobile Show in Philadelphia, Pa., under direction of the Automobile Trade Association.

February 1—Automobile Road Race in Cuba, under direction of the Cuban Automobile Association.

February 1—Cycle and Automobile Trade Journal Ninth Annual New York Show, Review Number, circulated during Chicago show.

February 6-13—Chicago National Automobile Show, National Association Automobile Manufacturers, New York City. S. A. Miles, Manager.

February 15-20—St. Louis Automobile Show, St. Louis, Mo., New Coliseum Building; St. Louis Automobile Manufacturers' and Dealers' Association.

February 15-20—Second Annual Show of Detroit Automobile Dealers' Association, Wayne Pavilion.

February 15-22—Detroit Automobile Dealers' Association Annual Show.

February 16-18—First Annual Show of Denver Motor Club, Auditorium, Denver, Colo.

February 16-23—1909 Motor Boat and Engine Show in Madison Square Garden, New York, under the auspices of the National Association of Engine and Boat Manufacturers. J. A. H. Dressel, Mgr., 138 W. 42d Street, New York.

February 18-25—Third Annual National Automobile, Motor Boat and Sportsmen's Exhibition of Canada, at Toronto, St. Lawrence Arena, under auspices of Ontario Motor League.

February 20-22—Three-day Automobile Carnival, Fair Grounds track, New Orleans, La.

February 22-29—Annual Show, Cleveland (Ohio) Automobile Dealers' Company.

February 27-March 6—Hartford Automobile Dealers' Association's Annual Automobile Show.

March 1—Cycle and Automobile Trade Journal Ninth Annual Complete Vehicle Review, circulated during Boston show.

March 1-6—Omaha, Neb., Automobile Show under the auspices of the automobile dealers of Omaha and Council Bluffs.

March 1-6—Seventh Annual Automobile Show at Convention Hall, managed by Buffalo Trade Association.

March 6-13—Seventh Annual Boston Automobile Show; Chester I. Campbell, Manager, 5 Park Square, Boston, Mass.

March 7-13—Second Annual Buffalo Power Boat and Sportsmen's Show at Convention Hall, Buffalo, under the auspices of the Buffalo Launch Club.

March 9-12—Fifth Annual Motor Boat Regatta, Palm Beacher Power Boat Association, on Lake Worth, Palm Beach, Fla.

March 27-April 3—Pittsburg Annual Show, Duquesne Garden; Pittsburg Automobile Dealers' Association.

March 31-April 11—Annual Monaco Motorboat Meeting.

April 1—Cycle and Automobile Trade Journal,- Boston Show, Review Number.

May 29—Wilkes-Barre Automobile Club's hill climb up Giants' Despair Course.

### Foreign.

January 16-25—Seventh Annual Automobile and Cycle Exhibition, Parc du Cinquantenaire, Brussels, Belgium. Syndical Chamber Automobiles and Cycles.

January 24-March 24—Aeroplane Contest at Monte Carlo, under the auspices of the International Sporting Club.

February—English War Office fourteen days' trial for light tractors.

January 22-30—Automobile Show in Edinburgh, Scotland, at the Waverly Market.

May 8-23—Sixth Antwerp International Automobile, Cycle, Maritime and Fluviatile Exposition.

June 10-18—Annual Prince Henry of Prussia Touring Competition.

## THE AUTOMOBILE TARIFF QUESTION

A joint committee has been appointed by the N. A. A. M., the A. L. A. M. and the A. M. C. M. A. to constitute the Automobile Manufacturers' Tariff Committee to investigate, and if possible, bring about a reform in the automobile tariff. At present automobiles are not given a special rating, but are classed under "Manufacturers of Metal Not Otherwise Provided For." An adjustment of duties on a wage-equalizing-basis which will protect the American manufacturers against foreign cars, produced at much less expense, is desired. Not necessarily an increase over the 45 per cent. duty is expected, but a general revision is necessary, and according to the heads of the committee an increase up to 60 per cent. would not be out of proportion to the difference in cost of production at home and abroad. The importers, nearly all of whom are represented by New York concerns, and who are only a very small number as compared to the number of automobile manufacturers in this country, are making a strong fight for a reduction in the tariff to 30 per cent., and it has been said that they would be satisfied even with a 12 per cent. reduction from the present duty; which is taken to mean that even with this reduction they would be able to flood the American market with cars at a price which the American makers could hardly meet unless the wages of American employees were reduced. Statistical data are being gathered by the manufacturers for presentation to the Ways and Means Committee at Washington. A hearing was given the Manufacturers' Tariff Committee on December 7th, but owing to the fact that this was the day of the opening of Congress the hearing was cut short, and Mr. Briscoe informed the Ways and Means Committee that the manufacturers desired two weeks' more time to prepare full data before definitely presenting their case, and another hearing was tentatively fixed for December 19th.

In the plea for a reduction of the tariff to 30 per cent. the importers asserted that the automobile business in this country was controlled by a trust and that 100 per cent. profits were being made. This assertion the committee of the mauufacturers of course refuted, and to substantiate their side of the case had gathered certain information in regard to comparative wages in Europe and America and also statistics concerning the number of automobile companies engaged in business since 1902 and those which had gone out of business during that time. According to statistics by the German Government the average annual wage of the automobile workman is $306 against $755.05 in this country; commercial employees $529 against $876.07; technical employees $602.50 against $1,202.41. It will thus be seen that the wages paid abroad are considerably less than half those paid our own workmen. The following is a table of statistics of the trade used by the Manufacturers' Committee:

In 1902, 51 concerns in business; 18 discontinued; 33 carried over into 1903; in 1903, 71 new concerns started; 30 discontinued; 41 carried over into 1904; in 1904, 54 new concerns started; 40 discontinued; 14 carried over into 1905; in 1905, 51 new concerns started; 38 discontinued; 13 carried over into 1906; in 1906, 43 new concerns started; 29 discontinued; 41 carried over into 1907; in 1907, 51 new concerns started.

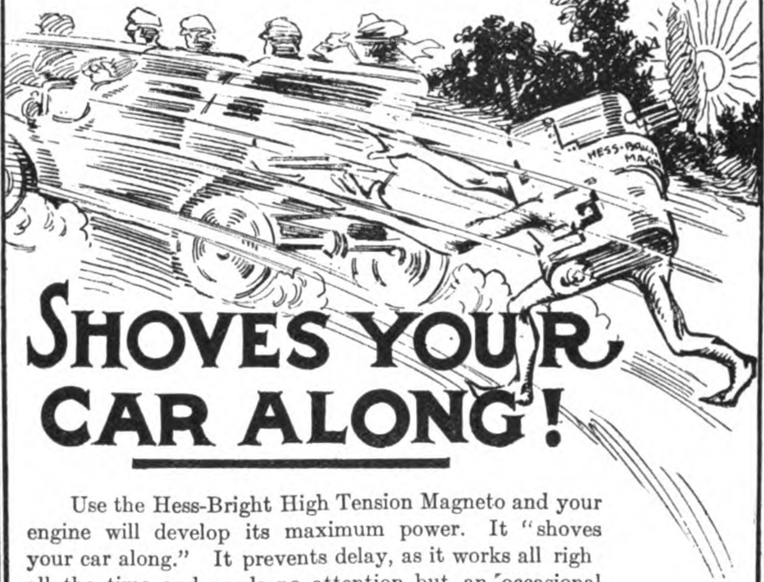
This record shows 51 concerns in business in 1902, and only 21 of these have survived and are in business to-day. From 1902 to 1906 inclusive, 270 new concerns have started, making with the 51 original concerns, 321. During the five years 155 discontinued, leaving in business December 31st, 1906, 166 automobile makers. At the present time there are listed about 253 makers of whom about 100 are turning out cars in quantities.

The higher cost of labor in this country has been mentioned. Materials abroad are cheaper, ground rent and cost of living are less, and the industry is not taxed as heavily. All machinery imported for use in a new industry in most of the European countries is admitted duty free or at a preferential tariff. Under these conditions, quoting a statement from the Manufacturers' Committee: "Tariff rates must afford ample protection to American made goods and provide a custom's duty on imports equal to the difference in cost of production here and abroad."

## IMPORTS AND EXPORTS

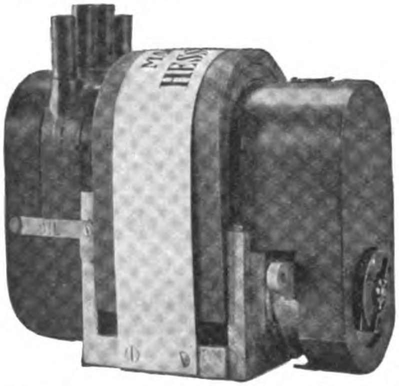
For the month of October, 1908, a total of 179 automobiles and parts were imported from the United Kingdom, France, Germany, Italy and other countries, representing a cash value of $327,511. For ten months of the year 1908 ending with October, 1,135 cars and parts were imported, valued at $2,131,400, as against $2,602,016 worth of cars imported last year. Exports for the month of October, 1908, aggregated 106 cars, valued at $165,837 and parts amounting to $47,938 or a total of $213,775. For the ten months of the year, ending with October, 1,918 cars were exported, valued at $3,971,406 and $525,097 worth of parts, or a total of $4,496,503.

Unusual activity marks the factory situation throughout the country. Production along the lines of the new models is reported to be going forward with a great deal of vim. The agency outlook is very optimistic and the demand bids fair to exceed estimates made early in the season. It is probable that much deferred buying will be put through early in the year. The touring season of 1909 will undoubtedly begin early, weather conditions permitting, while the steady call for closed cars is one of the dominant factors in the market.



# SHOVES YOUR CAR ALONG!

Use the Hess-Bright High Tension Magneto and your engine will develop its maximum power. It "shoves your car along." It prevents delay, as it works all righ all the time and needs no attention but an occasional oiling.



## THE HESS-BRIGHT HIGH TENSION MAGNETO

Its efficiency is not its only merit. Note its classic lines. No projecting parts. **Simple, Serviceable, Sure.** Few parts—all strong. No complication—no trouble.

Same high grade as Hess-Bright Ball Bearings

**HESS-BRIGHT MFG. CO.**

2102 Fairmount Avenue PHILADELPHIA

## A. A. A. SIXTH ANNUAL DIRECTORS' MEETING

The Sixth Annual Meeting of the Directors of the American Automobile Association was held at the national headquarters, 437 Fifth Avenue, New York, November 30th. Both meetings were largely attended. The annual reports of the officers were filed and considered. The following resolutions were emphatically and unanimously adopted:

Whereas, Automobile speed contests on circular tracks built for horse racing has ceased to serve any useful purpose; and whereas, such contests do not have the approval of the general public or any considerable portion thereof; be it

Resolved, That speed contests by automobiles on circular tracks built for horse racing and of a mile or less in length be condemned by this Association; and be it

Resolved, That hereafter this Association have nothing whatever to do with such contests.

It is hoped that this action by the A. A. A. will go far to put a stop to circular track racing. On Wednesday afternoon, December 2, an adjourned meeting of the Board of Directors was held, and the following officers were elected for the ensuing year: President, William H. Hotchkiss, Buffalo, N. Y.; First Vice-President, L. R. Speare, Boston, Mass.; Second Vice-President, Ira M. Cobe, Chicago, Ill.; Third Vice-President, Frank H. Joyce, Minneapolis, Minn.; Treasurer, H. A. Bonnell, East Orange, N. J.; Secretary, F. H. Elliott, New York.

The racing board was abolished, and its vocation vested in the contest board, and sixteen members in addition to the president, first vice-president, secretary, treasurer and board chairman were named to constitute the executive committee.

## THE GRAND CENTRAL PALACE SHOW

There is apparently no inclination on the part of the manufacturers or the public to discontinue automobile shows. This is shown by the tremendous rush for space which has been so great that although the Grand Central Palace has an increased exhibition capacity there has not been sufficient room to accommodate all those desiring to exhibit. This may be partly due to the fact that it has been fifteen months since the last show was held. This year there will be in addition to the regular automobile trade, carriage and wagon dealers who intend to add motor cars to their vehicle stock. No less than 77 manufacturers of complete motor cars and 230 makers of accessories will exhibit at this show. These include 66 distinct types of pleasure cars and 11 makes of commercial vehicles including everything from low-powered delivery wagons at $500 up to the 10-ton trucks costing $6,500. This year the importers' salon, in which will be displayed the latest 1909 models of the leading foreign cars, gives added interest to the pleasure vehicle exhibits. It is said that more than $30,000 has been expended in decorations and lighting and eight months' preparatory labor has been required to produce the decorative effects necessary to properly set off the leading makes of cars. Special arrangements have been made this year for catering to the needs of the inner man in a more business-like manner than heretofore and a very complete Press department is located on the second balcony, in which is provided a room for the Show Committees' headquarters, and a workroom for press representatives.

The following is the schedule for the week:

Thursday, December 31, 8 P. M.—Private view of automobile show; meeting, Executive Committee, New York Automobile Trade Association, 8 P. M.; "Gala Night;" 10 A. M., meeting, Show Committee, A. M. C. M. A.

Friday, January 1—Army and Navy Night.

Saturday, January 2—Student's Night; 10.30 P. M., show smoker to visiting motorists and dealers at A. C. A. Clubhouse.

Monday, January 4—2 P. M., Executive Committee meeting, American Automobile Association; Engineers' Night.

Tuesday, January 5—10 A. M., Executive Committee meeting, National Retail Automobile Dealers' Association; Society Night; 4 P. M., meeting, Board of Governors, Automobile Club of America; 1 P. M., show luncheon to exhibitors by A. M. C. M. A., Hotel Manhattan; meeting, Society of Automobile Engineers.

Wednesday, January 6—10 A. M., meeting of Committee of Management, A. M. C. M. A.; 8 P. M., meeting, Board of Directors, Importers' Automobile Salon; Executive Committee meeting, Motor and Accessory Manufacturers; Merchants' Night.

Thursday, January 7—Executive Committee meeting, American Motor League; Municipal Night.

## S. A. E. NEW YORK MEETING

The Fourth Annual Meeting of the Society of Automobile Engineers will be held in New York at the Club House of the Automobile Club of America, on Tuesday, January 5th, and at the Engineer Society's building, 29 West 39th Street, on Tuesday, January 19th. Tests of the A. C. A. adenamommeter will be made on different cars, and the following papers will be read: "Economics of Weight Reduction," by F. D. Howe; "The Factor of Reliability in Ignition Apparatus," by A. Atwater Kent; "Requirements of Automobile Brake Construction," by Lawrence Whitcomb and Thomas J. Fay. These will be read at the first meeting and followed by the dinner given by the society at the Automobile Club. At the second meeting the following papers will be discussed: "Improved Type of Compression Coupling," by W. S. Noyes; "Standardizing Automobile Motor Bearings," by S. P. Wetherill, Jr., and "Some Practical Considerations in Autogenous Welding," by Henry Cave. These papers will be followed by the society dinner at the Engineers' Club.

## SEVERE ARRAIGNMENT FOR RECKLESS DRIVING

In a recent case in the Connecticut Supreme Court a chauffeur was sentenced to not less than three nor more than four years in States prison for reckless driving and running down and killing a pedestrian. Connecticut is one of the few States that recognizes the principle of holding drivers responsible for their manner of driving, and does not attempt to control them by making petty regulations stating exactly what shall and what shall not be done, the speeds to be maintained here and those not to be maintained at another point, etc., and also recognizes that when a case of flagrant recklessness comes up, the offender should be dealt with in a summary manner. In the instance in point the driver was said to have been intoxicated, and the point was well taken by the judge that this if anything was a condemning rather than a condoning circumstance. The position taken cannot be better expressed than in his own words:

> "It seems to me that this case presents a particularly grave instance of criminal recklessness, and while I am fully impressed with the strong evidence presented here as to this man's previous excellent character, that neither condones his offense nor makes it possible for the court to overlook the public rights in imposing sentence. There is no more room on our public streets for an automobile in the hands of a drunken chauffeur than there is for a loaded rifle in the hands of a drunken soldier; one is hardly less a menace to human life than the other. But while this case is a serious one and calls for a serious penalty, it is well also to remember that an actual criminal intent is lacking. It is the man's gross recklessness that has brought him here, his gross disregard of the rights of other travelers, and his gross abuse of the responsibilities which every reasonable man should feel attends the running of an automobile on the public street, and I trust the lesson which this case suggests will lodge with profit to themselves and with benefit to the rest of the public in the minds of that obnoxious class of automobile drivers, who obey no law that runs counter to their own selfish convenience."

## BRIARCLIFF RACE CONDITIONS

At a meeting of the Briarcliff Race Committee held Monday, December 21st, at the Automobile Club of America, the following conditions of eligibility for the race were unanimously decided upon. The maximum bore was placed at 4⅝ inches, maximum stroke 6 inches, minimum wheel base 118 inches and minimum weight 2,300 pounds. In the restrictions originally adopted the maximum bore was placed at 5¼ inches, with no limit on the stroke; a minimum weight limit of 2,600 pounds and a minimum wheel base of 110 inches.

As these restrictions as finally adopted can produce practically nothing but strictly stock models the clause in the Deed of Gift of the Briarcliff Trophy which calls for the sale previous to the race of at least ten similar models to the one entered will be eradicated if possible. The maximum bore and stroke adopted apply to four cylinder motors only. Equivalents for both dimensions in motors of a greater or less number of cylinders are to rule.

## JOHN B. ROWLAND DEAD

John B. Rowland, of New York City, died December 18 of typhoid fever which it is said he contracted by eating raw oysters on November 4 in a New York hotel. He and four others, all of whom were also laid up with the same malady, dined together on the day after election and were stricken the next day.

Mr. Rowland was thirty-one years old and was born in Washington, D. C. He was a graduate of Georgetown University and in 1900 married Mabel Levi. He was well known in the automobile trade as an advertising man and was head of the Rowland Advertising Co.

Rowland Advertising Agency, has been organized and incorporated under the laws of the state of New York with a capitalization of $12,000, which has been fully paid. This corporation has acquired all the assets of every kind and nature of the business formerly conducted by the late John B. Rowland, and has also assumed all his business liabilities. Mr. Clarence O. Sacks, who for years has been associated with Mr. Rowland, is the President and Treasurer. Mr. Eugene F. Kinkade, member of Congress of the State of New Jersey, and also President of the New Jersey Street Car Advertising Company, of Newark, New Jersey, is the Secretary and also a Director of the Company.

## NEWS ITEMS

A three-day automobile carnival will be held at the Fair Grounds track, New Orleans, on February 20, 21 and 22, during the Mardi Gras festivities.

During the past year the membership of the American Automobile Association has been augmented by fifty-five clubs and 3,000 individuals.

The 7th Annual Automobile Show in Buffalo, N. Y., will be held at the Convention Hall, from March 1st to 6th, under the management of the Buffalo Automobile Trade Association.

The Third Annual National Automobile, Motor Boat, and Sportsmen's Exhibition of Canada will be held in the St. Lawrence Arena, Toronto, from February 18th to 25th, under the auspices of the Ontario Motor League.

The Denver Motor Club will hold an automobile show in the Auditorium, Denver, Colo, February 16, 17, 18, 1909. It is the intention of the club to continue the show as an annual feature. Ralph N. Smith is chairman of the show committee. He may be addressed at the Savoy Hotel, Denver.

## FOREIGN RACING RULES UNSATISFACTORY TO AMERICAN CAR MAKERS

According to A. L. Ricker, President of the Mechanical Branch of the A. L. A. M., the position in which American automobile manufacturers who build racing cars and might care to enter the Grand Prix race of France are placed, is very unsatisfactory.

In 1908-1909 racing cars built abroad, by virtue of an international ruling, were restricted as to their cylinder bore. For the Grand Prix and other events intended for large cars, the bore was 6.1 inches. For the English Isle of Man contest the limitation was 4 inches, causing the name "four-inch race."

The bore of the small cars for the race, run the day preceding the Grand Prix, was restricted also. No limitation whatever was placed on the stroke, and according to Mr. Ricker, his study of the strokes of the foreign racing cars for 1908 shows that many of them are in reality freaks.

For 1909 the Europeans have decided to reduce the bore to 5.1 inches, still with no limitation on the stroke, although the A. C. A., in a reply to the request of the racing powers abroad, advised a classification by volume. Such a classification would place not only four, but six-cylinder motors in the same class and encourage rational motor design and the building of cars that would have a commercial value after the race. However, with no limitation on the stroke, cars with long stroke will undoubtedly be built, and although European builders, owing to the large number of events in which their cars can be entered can get returns for the money invested, even if freak cars are built which have no after value, this is not the case with American makers.

Under these circumstances American makers must either build cars which will be practically of no value to them afterward, simply for the sake of entering one or possibly two races, or they must keep out altogether, so it is very little wonder that few, if any, American manufacturers will enter cars in such contests.

## AUTOMOBLE TRADE CREDIT ASSOCIATION GROWING.

This association is purely co-operative and a non-money making organization, managed by its own members for their own benefit and is thus an organization of interest to the trade in general. It has enjoyed a solid and substantial growth, its membership comprises many of the best firms in the country, and it is a disinterested attempt of reputable concerns in the trade to protect themselves.

A new feature that bids fair to be of great value to the members is a committee to handle the claims of the members against bankrupt concerns in such a way as best to conserve the interests of creditor members.

The growth and strength of this association continue to be shown by the more recent accessions to its membership, among which are the following: Ajax-Grieb Rubber Company, New York; Automobile Improvement Company, Chicago; E. M. Benford, Mt. Vernon, N. Y.; Bi-Motor Equipment Company, Boston, Mass.; Albert Champion Company, Boston, Mass.; Chicago Battery Company, Chicago, Ill.; Cincinnati Ball Crank Company, Cincinnati, Ohio; Wm. Cramp & Sons Ship & Eng. Bldg. Co., Phila.; Firestone Tire & Rubber Company, Akron, Ohio; Manhattan Electrical Supply Company, New York and Chicago; C. A. Metzger, Inc., New York; A. R. Mosler Company, New York; Nathan Novelty Manufacturing Co., New York; Rajah Auto Supply Company, Bloomfield, N. J.; Royal Equipment Company, Bridgeport, Conn.; Rushmore Dynamo Works, Chicago, Ill.; F. W. Spacke Machine Company, Indianapolis, Ind.; Stevens-Duryea Company, Chicopee Falls, Mass.; Universal Electric Storage Battery Company, Chicago; Western Electrical Company, Chicago; Wheeler & Schebler, Indianapolis, Ind.; Worcester Pressed Steel Company, Worcester, Mass.

## NATIONAL ORGANIZATION OF CHAUFFEURS PROPOSED

The Chicago Automobile Show, to be held February 6th to 13th, 1909, will be the scene of a meeting to be held for the purpose of forming a national organization of chauffeurs. The subject was broached by the Professional Chauffeurs' Association of Louisville, Ky., shortly before the last show, and has been simmering since, resulting in a determination to hold a convention Friday, February 12th, during the Chicago show in one of the company rooms of the First Regiment Armory.

## DEATH OF R. L. COLEMAN

R. Lindsay Coleman, one of the pioneers of the automobile industry in this country, died recently at his home in Somerset, Va. Mr. Coleman was president of the bicycle trust at the time of its failure and also head of the resulting National Battery Co., until its recent failure.

Although it has had a phenomenal growth and is a husky child, automobile manufacture in this country still comes under the head of "infant industries," which it is the theory of protection to guard from the competition of the cheap labor of the older countries of Europe. As against the arguments of the importers, who are asking for a lower tariff, it is probable that the plea of the American makers for no reduction will prevail when the matter of tariff revision is taken in hand seriously.

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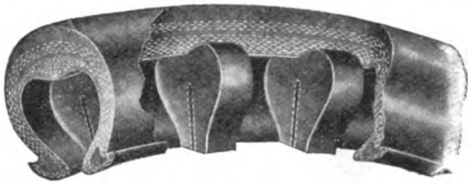

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During the season of 1908 we made thousands of tires and sold them in nearly every State in the Union and several foreign countries, for all weights of cars from 900 pounds to 4500 pounds unloaded, driven by all kinds of drivers on all sorts of roads. Many of them have already run from 3000 to 5000 miles and are still in good condition, and appear to be good for two or three times as many more miles.

There is nothing new mechanically, nor "freakish" about a Dayton Airless Tire. It is built exactly as an engineer would construct a bridge. The rubber columns in the tire correspond with the columns of a bridge, while the tread surface of the tire corresponds with the road surface of the bridge; and the heavy annular rib or extra fabric in the tire, forming the very thick tread, corresponds with the heavy beams connecting the bridge columns. This heavy annular rib or fabric in the tire strengthens between columns, so that there will be no more depression between the columns than right over the columns, hence the tire wears uniformly all around the tread. The columns vary in thickness and strength corresponding with the different weights of cars.

The difference between a DAYTON AIRLESS TIRE and a solid tire is the difference between a properly constructed bridge and a dam.

**We will guarantee:**

**First.** That the tire rides as easy as a properly inflated Pneumatic tire.

**Second.** That it will sustain its rated carrying capacity stamped thereon, and retain its resiliency, and the columns will not crush down.

**Third.** That a car equipped with our tire will not consume any more gasoline and will run as fast as if equipped with pneumatics.

**Fourth.** That it will outlast several average pneumatic tires.

**Fifth.** That it will fit Standard Clincher rims; can be applied easily and cannot come off in use.

Write *to-day* for illustrated catalogue containing full particulars of tire, guarantee and testimonials, even though you are not in immediate need of new tires. It will pay you to know the "last word" on tires—the 1909 Dayton Airless.

**DAYTON RUBBER MFG. CO., Dayton, Ohio, U. S. A.**

**New York Salesroom, 1968 Broadway**

See us at Space 316, Third Floor, Grand Central Palace Show, December 31 to January 7. Also Space 445, Third Tier Boxes, Madison Square Garden Show, January 16 to January 23.

THE NATIONAL SHOW

Will be Held as Usual At

**Chicago**

Under the auspices of THE NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS, Inc.

**February 6 to 13**

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The usual courtesies will be extended to visiting agents.

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7 East 42d Street, New York

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**Motor Buggy Equipment**

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MOTOR BUGGY SPECIAL

**THE TIRE YOU MUST HAVE FOR THE MOST SATISFACTORY WORK IN THIS FIELD**

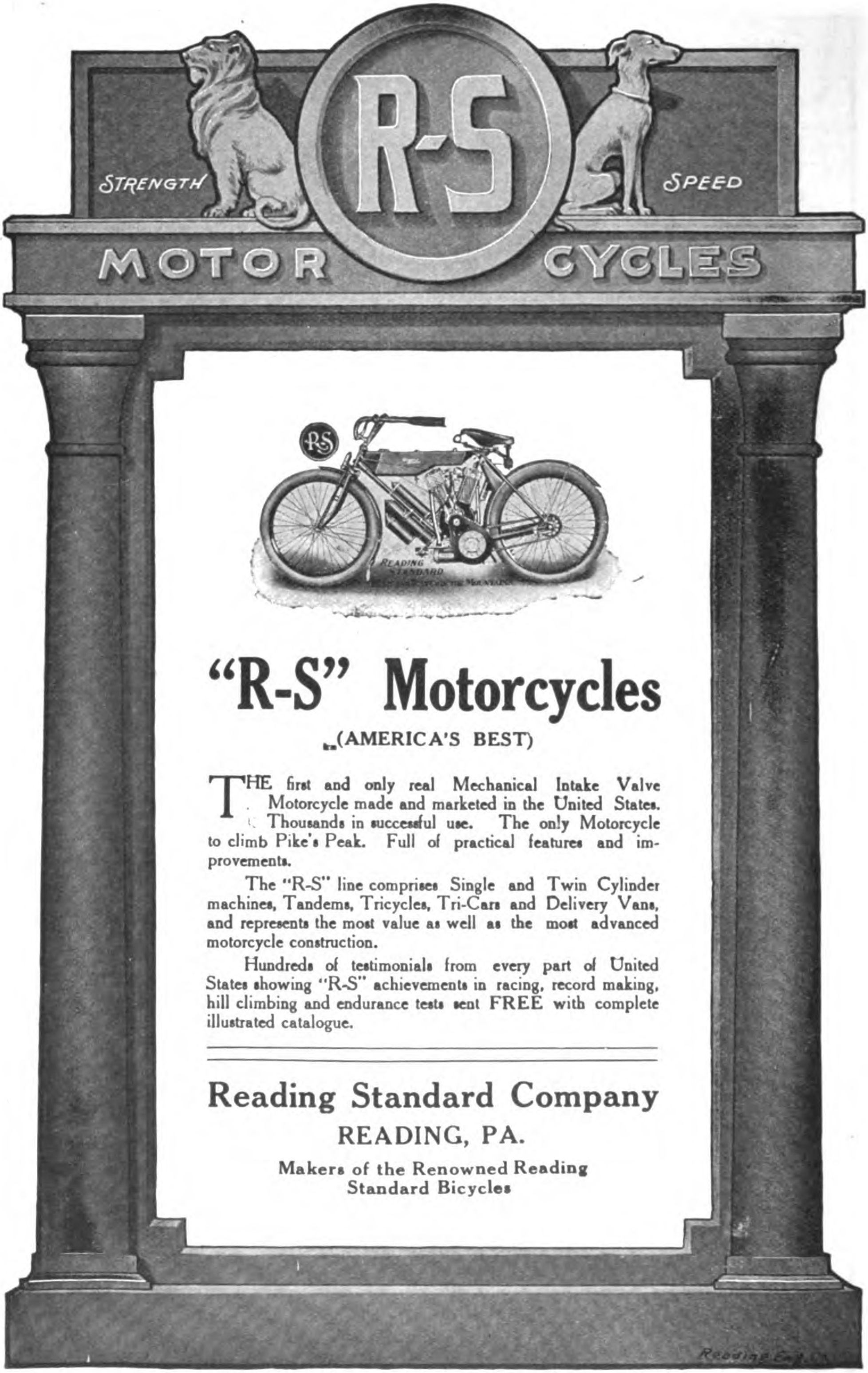
**Regular Pneumatic Equipment**

**Better Tires for 1909 than you have ever before been offered.**

**In the successful manufacture of tires for racing cars, we have utilized exclusively that test as it applies to work of greater importance—every-day use and touring.**

**There is only one 100% efficiency quick acting rim—THE MARSH.**

**THE DIAMOND RUBBER COMPANY :: AKRON, OHIO**



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Standard Bicycles

# CYCLE AND AUTOMOBILE TRADE JOURNAL

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Philadelphia, January 1st, 1909

## CONCERNING THE AUTOMOBILE TARIFF

The American automobile industry has now reached the stage at which it is considered by manufacturers that automobiles should have a separate classification among manufactures instead of their present rating among "other manufacturers of metal not otherwise provided for." The subject of tariff revision along these lines has been agitating the various automobile organizations and has been much increased by the fight among the few importers in New York to have the tariff on imported automobiles reduced.

An adjustment of the duty on automobiles is doubtless in order, but there seems to be no good reason why the resulting rates should not be based on the comparative wage-earning capacity of the foreign and American mechanics, the tariff to be so framed as to offset the extremely low cost of production in foreign countries, protecting the American manufacturer of automobiles in exactly the same way that the tariffs have protected in the past other great American industries, for it cannot be questioned that automobile manufacturing now forms one of the most prominent industries of our country. The automobile Manufacturers' Tariff Committee, made up of representative men of the industry have, during their recent meetings, completed a brief which was submitted to the Ways and Means Committee at Washington, and the statement has been made by the manufacturers' representatives, that the question of the tariff does not concern the manufacturers any more than it does labor, and this is one point which they expect to prove to the authorities at Washington. For this purpose a large amount of data has been gathered together for presentation. The automobile manufacturers do not ask or desire any special treatment other than that accorded to other representative industries, but feel that in order for the American maker to receive adequate protection even an increase of the existing rate of 45 per cent. would not be out of order, although it is understood that the makers will be satisfied with the existing rate. Owing to the fact that automobiles have come into general use since the passage of the Dingley bill they are classified under "manufacturers of metal," which of course is a matter that should receive attention and be adjusted so that such a large and important manufactured product will have a suitable classification of its own.

There seems to be no good reason why the demands of the American makers that the tariff on automobiles should be so framed as to protect the American workman against the low wages paid abroad should not be acceded to. The fact that a mere handful of importers in New York, who do not represent any industry or any mass of workmen whatever in this country, are looking for a reduction so that they can dominate our home market with a foreign product, seems to be no valid reason why the tariff should be reduced. when the mass of American laborers and the tremendous amount of money invested by American manufacturers are on the other side of the scale.

The principle of protective tariff is that held by the political party now in power and one which has been very consistently adhered to throughout the history of the phenomenal growth of many of the large American industries. The principle of protection is simply, that such duties be imposed on imported products as will equal the difference between the cost of production here and abroad. Figures now in possession of the Manufacturers' Tariff Committed based on 11,400 men in American factories and 10,347 men in European factories show that the average American workman receives about two-and-a-half times what is paid for the same kind of work in European factories; commercial employees about one-and-three-fifths as much and technical employees approximately twice as much as is paid in Europe. The better living conditions enjoyed by the American mechanic is a matter of which the American nation as a whole is justly proud. In order to maintain this high standard of living of our wage earners and in justice to American automobile manufacturers and allied industries it would seem that the Ways and Means Committee can give but one decision—that of maintaining the system which has been tried and tested for years and has been shown conclusively to be of inestimable benefit.

The very small margin between protection and virtually no protection can be realized when it is understood that even a reduction of 12 per cent. from the present tariff it is said will be entirely satisfactory to the importers—in fact, a reduction of but 12 per cent. would enable them to throw upon our market a mass of foreign made automobiles at prices with which the American maker could hardly compete without sacrificing either the quality of his product or reducing the wages of his men. Let us have tariff revision—a special classification for automobiles the same as given to other products which are produced in large quantities, but by all means hold the tariff at a point which will in every way protect not only the American manufacturers, but what is more important, maintain the standard of wages and the method of living of the American wage earners.

## UNIFORM AUTOMOBILE LAWS DESIRED

The recent Convention of Governors, held in Boston, at which a movement for equalizing legal measures pertaining to automobiles in the various New England States was made, is certainly a step in the right direction, and shows that interest is awakening along the line of uniformity in automobile laws. Since the agitation in regard to a uniform Federal license other regulations pertaining to automobiles have also been brought to the attention of the public, and slowly but surely opinion is being moulded and sentiment is growing for the passage of more uniform regulations.

It is well known that the requirements of the various States are not only extremely varied, but in some instances absolutely contradictory, and as the automobile is, more than any other outside of railroad trains or boats, an Interstate vehicle, these conflicting regulations impose hardships upon tourists.

The passage of uniform laws with of course only such variations as are demanded by local conditions is most to be desired, not only by motorists but by all road users. Such uniformity makes it possible for drivers to know with certainty what to do in any and all emergencies and would have a tendency to lessen road accidents. If such a variation existed in the regulations on the water as now exists in the regulations on the road, there would undoubtedly be a tremendous protest immediately entered by all users of the waterways and such a state of affairs would not be tolerated for any length of time. The same would doubtless be true in the case of the automobile only the matter is yet so new that nothing is thought of it. However, all such movements tend toward the awakening of public attention to these matters and sooner or later must necessarily crystalize into results which will be of great advantage to the motoring public.

## DISCOUNTS ONLY TO THOSE ENTITLED TO THEM

Of recent years a dishonest practice has grown among a certain class of dealers and individuals of endeavoring to obtain automobile supplies and accessories at rates given only to legitimate jobbers. This practice has gradually grown to such proportions that it is time some action was taken by the manufacturers and jobbers tending toward limiting the possibilities of individuals and dealers of successfully representing themselves as legitimate jobbers in the trade and obtaining goods at prices which should be reserved for the latter alone.

To be sure dealers are given suitable discounts by the jobbers and also by manufacturers, but these are not as large as can be obtained if they can successfully represent themselves as jobbers in their respective lines. Investigation of this matter has shown that all kinds of petty tricks and devices are resorted to by these unscrupulous members of the trade, or by grasping individuals to make their mail matter appear as though emanating from a jobbing house. In certain instances cards have been gotten out evidently with the sole purpose of giving the people to whom they were mailed the impression that they came from a jobbing house. Some have gone so far as to prepare small catalogs of goods solely for the purpose of misleading manufacturers and thus obtaining the larger discount given to the jobber. Thus far no systematic or organized effort has been made to counteract this very prevalent and rapidly increasing abuse of trade discounts and much discontent, dissatisfaction, injustice and injury have already resulted.

There is a distinct difference between a legitimate jobber and even a large dealer who handles both cars, accessories and parts and covers a large territory. The jobber sells maybe in lots no larger than some of the more prominent dealers in large cities, but the dealer is a retailer while the jobber's trade is with dealers. In other words, he is what might be termed the first middleman, and the prices to him and his prices to the dealers are made accordingly. The dealer, on the other hand, is supposed to cater only to individuals and handle nothing but retail trade, and not sell or supply other dealers or automobile companies. The relative prices must be held, and remain in proportion or difficulties will immediately ensue. Steps must be taken very soon to limit the spread of this abuse of discounts. In view of the present situation, this action should come from both the makers and the jobbers, and as a suggestion the following steps might be taken: During the shows when nearly all of the makers and large jobbers are gathered together in New York, a representative meeting could be held and a committee of three appointed by the makers and also by the jobbers, this joint committee to appoint a seventh member, the seven to form a committee with power to formulate lists of the recognized jobbers excluding those whom jointly they consider cannot be classed as legitimate jobbers. Such a list could be maintained and kept up-to-date, copies of which should be in the hands of each and every manufacturer after each revision at stated periods. In this way the manufacturers could act in unison in the matter and there would be perfect assurance that all applicants for discounts would be treated in the same manner and that there would be no discounts to those who were not strictly entitled to them. This would protect not only the jobbers, but also the makers, and would practically put a stop to the pernicious practices to which we have referred. We trust that some such concerted action as that suggested in this editorial will be taken in the very near future by the manufacturers and jobbers.

## ELECTRIC VEHICLE CHARGING BY CENTRAL STATIONS

Those who are watching closely the progress of the automobile into public favor and universal use have been surprised at the tremendous increase in the number of electric vehicles in common use. During the past two years large advances have been made in the way of improvements, not of a radical nature, but tending toward economy, cleanliness and ease of operation, and also in the methods of selling these quiet, but effective machines. The increase in the use of these vehicles has been brought about so quietly and unobtrusively that many have not realized what has actually taken place. Nevertheless, in spite of the increased sales on this particular line of vehicles, there are still open, large territories in which very few electric vehicles are yet placed, and there seems to be in certain districts a sort of hesitancy about adopting this type of carriage. One of the chief reasons for this state of affairs is doubtless the lack of facilities for charging the batteries, and although it seems difficult to conceive why charging and central stations have not made an effort to cater to what would certainly prove a lucrative side line in the way of supplying current to automobilists, yet the fact that no apparent effort has been made to any extent by these central stations is evident to any who wish to investigate. These same central stations spend enormous sums yearly in an endeavor to enlist the patronage of household users of electric current for lighting and yet ignore the demands of electric vehicle users, each of whom would annually consume in all probability more current than any consumers of current simply for household lighting purposes.

The situation may possibly be this: The electric vehicle user, or intending user, is holding off until public charging stations become more frequent and the charging by central stations becomes customary, and the central stations are awaiting the time when the use of electric vehicles will become so general as to demand their attention. Under these conditions there is a chance for some of the power supplying stations to get into the field early and establish a precedent, and a paying branch of this business, and this without any great additional cost to the ordinary routine running expenses.

No small number of electric vehicle users are preparing themselves to take care of their own charging and makers of small power apparatus and manufacturers of charging apparatus, realizing this tendency, have jumped into the field and now supply some very efficient apparatus, but the majority of electric vehicle users doubtless will depend upon regular charging stations provided these are sufficiently numerous and well distributed to meet their requirements.

These conditions will naturally right themselves, giving better service to electric vehicle users, increased sales of such vehicles, and a paying business to central stations in the comparatively near future; but what is needed at the present time is a campaign of education so strenuously conducted that the vehicle makers, the central stations and many of the electric vehicle users will get together and formulate some definite plan of action looking toward a general supply of current to automobile users by the many central stations which are at present doing nothing alone this line. The initial step will doubtless come from the vehicle makers, who by concerted action could enlist the sympathies of present vehicle users and bring the matter forcibly to the attention of those in control of the central stations. It is only by some such concerted action with a definite plan of co-operation previously decided upon that the results desired can be brought about in a short space of time—otherwise matters will have to take their own course and eventually reach the same end.

In face of the apathy shown by the central station managements, the tremendous increase in the last two years in the use of the electric vehicle and the great advantages to be gained by all parties concerned, it is certainly time that the electric vehicle manufacturers co-operate, form a concrete plan and make an aggressive and concerted movement which will speedily bring about the desired action on the part of the central stations.

## LEGISLATIVE AND LEGAL

### ASBURY PARK BOARD OF TRADE ASK FOR LIBERAL AUTOMOBILE LAW

The following resolution by the Asbury Park Board of Trade, introduced by Charles R. Zacharias and unanimously adopted, calls for more liberal treatment on the part of the New Jersey Legislature toward automobilists from other states:

"Whereas, the State of New Jersey, whose excellent roads have become famous throughout the nation, now has on its statute books a law governing the licensing of automobiles, which law has been deemed a great injustice to transient automobile tourists, inasmuch as it exacts too great a fee for the privileges enjoyed, and

"Whereas, thousands of automobilists who formerly visited Asbury Park to enjoy the matchless roads of this section are now shunning this state and contributing support to resorts in other states because of this unwise and unjust law, therefore be it

"Resolved, that the Asbury Park Board of Trade request the New Jersey Legislature and Governor Fort to extend such legislative relief as in their wise opinion will give the automobile owners of other states an opportunity to bring their cars into the State of New Jersey for a reasonable period without being required to pay any fee."

### AUTOISTS AFTER ANOTHER JUSTICE

The Hudson Valley Automobile Club of Poughkeepsie, N. Y., are making a vigorous attack upon Justice Hoppe, of Poughkeepsie, claiming that he has made himself very obnoxious by his unnecessary severity, and also that he has been making illegal arrests. The secretary, E. O. Bartlett, Jr., of the club will be glad to hear from any persons who have been arrested by Justice Hoppe during the past summer.

### TAXICAB TEST CASE

Police Commissioner Smith, Detroit, Mich., brought complaint against I. S. Schringer, manager of the Detroit Taxicab Service, for violation of the cab ordinance. The complaint is said to have been instigated by the horse cab drivers, who stated that while they had to pay licenses the taxicabs stood in front of cafes, etc., without licenses. The Taxicab Company stated they could not afford to operate under the fares prescribed under the license ordinance. Yet as taxicabs were demanded by the people, the Commissioner and Councils could see no way out of the difficulty unless the ordinance was amended.

### E. R. THOMAS EXPELLED FROM NEW JERSEY CLUB

On Monday, December 7th, after postponing the hearing several times, the New Jersey Automobile and Motor Club of Newark, N. J., decided to expel E. R. Thomas, a well-known New York turfman, for reckless driving. Thomas is still laid up with injuries received by his reckless driving on August 14th, when it was testified that he was driving at between 80 and 90 miles an hour when an accident occurred. This is the first drastic measure taken by an automobile club so far as we know against a prominent member for recklessness on the road, and doubtless other flagrant violations of the laws by club members will be dealt with in a similar manner.

### LEGAL NOTES

The police of Wichita, Kan., are taking active measures to break up the practice of some agents of making a garage out of the street in front of their establishments.

Justice Lauer, in Municipal Court No. 3, Manhattan District, New York, held that repairs made by garages or other repairing establishments must hold for a reasonable length of time or no money can be collected for such repairs.

The Massachusetts law which exempts nonresident motorists from registration for seven days does not exempt hired chauffeurs. This discrimination feature is to be tested in Dedham, Mass., in the case of B. D. Gray, chief engineer of the American Locomotive Automobile Co., Providence, R. I., who drove in Massachusetts without obtaining a license in that State. He drove in Rhode Island under the blanket license granted the Locomotive Co. for all its operators and was not required to have an individual license.

The Board of Governors of the A. C. A. have decided that the Club shall take up the matter of automobile legislation to correct the defects in the present law and enable the effectual suppression of reckless driving by chauffeurs, and the whole matter has been referred to the Law and Ordinance Committee. All members of the Club who may be interested in the subject are requested to communicate their suggestions to Mr. Philip T. Dodge, Chairman of the Law and Ordinance Committee, Tribune Building, New York City, at their earliest convenience.

### WORKING FOR UNIFORM LAWS

During the Convention of Governors, held in Boston the latter part of November, the movement for a uniform enactment for the government of motorists was given considerable attention. Among the suggestions were the abolition of speed traps, which were characterized as "local political affairs"; the appointment of State officers to regulate the speed of automobiles, regulations requiring all vehicles to carry lights at night, and the abolition from the road of both reckless and drunken operators. A strong plea was also made in the interests of the New England States for a system of Interstate highways rendering the most remote districts accessible. It is expected that the respective Governor-elects of the six New England States in connection with their inaugural addresses will make recommendations in accordance with the suggestions of the convention.

In our December number, page 160, we gave the address of the New Idea Sales Co. as Horning, N. Y., instead of Corning, N. Y. There is no such post office as Horning, N. Y., and the error was a typographical one. We suggest that any of our readers who have addressed the concern at Horning write again to Corning, N. Y.

The question of the classification of automobile goggles was raised by Siegel-Cooper Company and other importers of New York City, who objected to paying 50 per cent. duty. It was claimed that the duty should be based on either the aluminum or rubber of which the goggles are made, but the Board of United States General Appraisers decided that goggles for automobilists are dutiable properly under the provision in the tariff for "goggles," and not according to the component material of chief value.

# THE CRESCENT

## GERMAN STONE ACETYLENE BURNER

**CRESCENT**

C
CRESCENT
VICTORY
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AUG. 31, 1897

**"VICTORY"**

**CRESCENT**

**"BIKE"**

**CRESCENT**

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IMPERIAL
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**"IMPERIAL"**

**Every Burner Guaranteed**

Our offer to pay $500 reward to anybody who can demonstrate to us that there is any style or make of burner in the markets of the world that will give more light than these CRESCENT BURNERS still holds good.

Write for particulars if interested.

The Crescent Burner Manufacturing Co. makes all styles of

**ONE PIECE GERMAN LAVA BURNERS**

but no metal goods.

A perfect Burner at a reasonable price.

As our shapes are imitated, note marks on pillars and tips, to avoid fraudulent imitations.

**FOR SALE EVERYWHERE**

**M. KIRCHBERGER & COMPANY**
**339 BROADWAY - - NEW YORK**

# Grand Central Palace Show

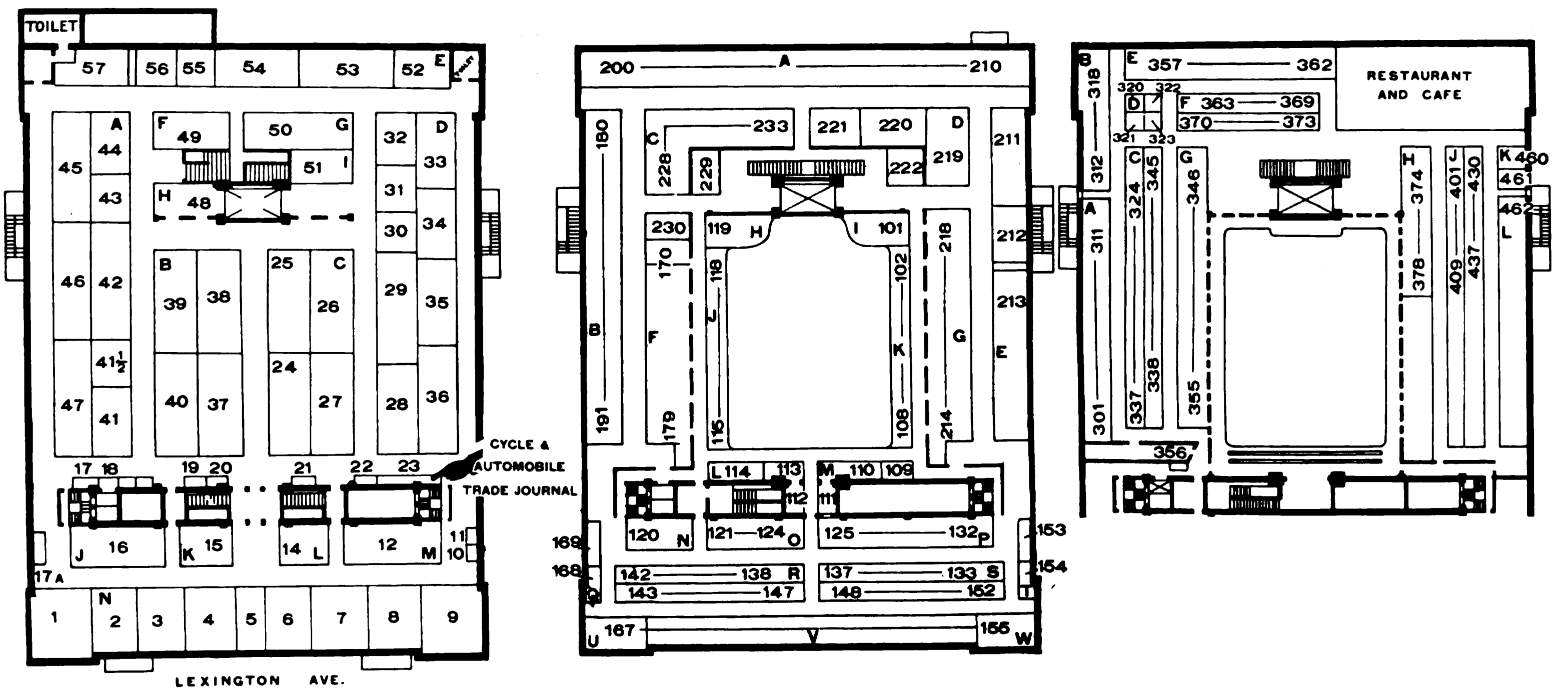
## ALPHABETICAL LIST AND LOCATION OF EXHIBITORS

### LIST OF ABBREVIATIONS.

| | |
|---|---|
| M.F. | Main Floor. |
| 1st B. | First Balcony or Second Floor. |
| 2d B. | Second Balcony or Third Floor. |

| | | | |
|---|---|---|---|
| Acme Motor Car Co. | M.F. | N | 2 |
| Aeronautics, Intern. School of | 2d B. | J | 417 |
| Ajax Grieb Rubber Co. | 1st B. | F | 172 |
| Alexander, H. T. & Co. | 2d B. | B | 317 |
| Allen Auto Specialty Co. | 2d B. | F | 363 |
| Allen Fire Dept. Supply Co. | 2d B. | J | 433 |
| American Automobile Asso. | 2d B. | F | 372 |
| American Ball Bearing Co. | 1st B. | O | 123 |
| Amer. Elec. Novelty & Mfg. Co. | 1st B. | Q | 168 |
| American Metal Hose Co. | 2d B. | C | 329½ |
| American Motor Car Co. | M.F. | E | 54 |
| American Motor League | 2d B. | G | 355 |
| American Motor Truck Co. | 1st B. | E | 212 |
| American Thermos Bottle Co. | 2d B. | A | 308 |
| American Thermo Ware Co. | 2d B. | C | 337 |
| Anderson Carriage Mfg. Co. | 1st B. | A | 207 |
| Anderson Forge Machine Co. | 2d B. | C | 339 |
| Atlas Motor Car Co. | M.F. | N | 9 |
| Atwater-Kent Mfg. Works | 1st B. | R | 144 |
| Atwood Castle Co. | 1st B. | V | 164 |
| Austin Automobile Co. | M.F. | N | 7 |
| Austro-American Separator Co. | 2d B. | E | 362 |
| Autocoil Co. | 1st B. | R | 140 |
| Auto Improvement Co. | 1st B. | Q | 169 |
| Automobilia | M.F. | | 17a |
| Auto. Co-oper. Asso. of Amer. | 2d B. | H | 375 |
| Automobile Club of America | 2d B. | E | 361 |
| Automobile Supply Mfg. Co. | 2d B. | E | 357 |
| Automobile Topics | M.F. | | 21 |
| Auto Tire Inflating Co. | 2d B. | J | 436 |
| Badger Brass Mfg. Co. | 1st B. | J | 116 |
| Baldwin Chain & Mfg. Co. | 1st B. | S | 152 |
| Batavia Rubber Co. | 1st B. | L | 464 |
| Benner Motor Car Co. | 1st B. | F | 230 |
| Benz Auto Import Co. of Am. | M.F. | H | 48 |
| Black Mfg. Co. | 1st B. | D | 220 |
| Bosch Magneto Co. | 2d B. | G | 248 |
| Bowser, S. F. & Co. | 1st B. | N | 120 |
| Brandenburg & Co. | 2d B. | G | 346 |
| Brewster & Co. | M.F. | A | 41½ |
| Bretz, J. S. Co. | 2d B. | C | 324 |
| Briggs, Wm. M. | 2d B. | J | 404 |
| Briscoe Mfg. Co. | 1st B. | P | 127 |
| Bristol Engineering Co. | 1st B. | G | 218 |
| Brown Co., The | 2d B. | C | 333 |
| Brown, John W. Mfg. Co. | 2d B. | C | 327 |
| Brown-Lipe Gear Co. | 1st B. | K | 108 |
| Brownell Motor Co., F. A. | 2d B. | J | 432 |
| Brush Runabout Co. | M.F. | D | 32 |
| Buckeye Mfg. Co. | M.F. | D | 35 |
| Buda Foundry & Mfg. Co. | 2d B. | C | 332 |
| Buffington & Co., C. A. | 1st B. | J | 411 |
| Bunnell & Co., J. H. | 2d B. | J | 435 |
| Burnet Compound Spring Inc. | 2d B. | C | 331 |
| Burrowes, E. T. Co. | 2d B. | A | 309 |
| Byrne Kingston Co. | 1st B. | T | 154 |
| C. G. V. Import Co. | M.F. | A | 41 |
| Caloris Mfg. Co. | 2d B. | A | 303½ |
| Cameron Motor Co. | 1st B. | A | 204 |
| Cartercar Co. | M.F. | L | 14 |
| Chadwick Engineering Works | M.F. | D | 33 |
| Class Journal Co. | M.F. | | 18 |
| Cleveland Autocab Co. | 1st B. | C | 228 |
| Coates-Goshen Automobile Co. | 1st B. | A | 206 |
| Coes Wrench Co. | 1st B. | V | 159½ |
| Columbia Nut & Bolt Co. | 1st B. | O | 122 |
| Commercial Truck Co. of Am. | 1st B. | C | 229 |
| Comptoir d'Innovation Pour Automobile | 2d B. | H | 374 |
| Conn. Tel. & Electric Co. | 1st B. | P | 129 |
| Consol. Rubber Tire Co. | 1st B. | V | 162 |
| Continental Caoutchouc Co. | 1st B. | F | 170 |
| Courtney Rubber Co. | 2d B. | B | 312 |
| Cowles, C. & Co. | 1st B. | S | 149 |
| Cox, Clarence E. | 1st B. | A | 203 |
| Cramp & Sons, Wm., Ship & Engine Bldg. Co. | 1st B. | R | 139 |
| Crawford Automobile Co. | 1st B. | D | 222 |
| Cycle & Auto. Trade Journal | M.F. | | 23 |
| Dayton Motor Car Co. | M.F. | B | 37 |
| Dayton Rubber Mfg. Co. | 2d B. | B | 316 |
| DeDietrich Import Co. | M.F. | B | 39 |
| DeDion Bouton Selling Branch | M.F. | F | 49 |
| Delahaye Import Co. | M.F. | G | 50 |
| De Luxe Motor Car Co. | M.F. | N | 8 |
| Diamond Chain & Mfg. Co. | 1st B. | P | 128 |
| Diamond Rubber Co. | 1st B. | I | 101 |
| Dixon Crucible Co., Jos. | 1st B. | B | 183 |
| Dow Tire Co. | 1st B. | B | 185 |
| Downing, Charles J. | 2d B. | C | 343 |
| Driggs-Seabury Ordn. Corp. | 2d B. | E | 360 |
| Duffy Grease Co. | 2d B. | J | 431 |
| Eastern Carbon Works | 2d B. | C | 338 |
| Edmunds & Jones Mfg. Co. | 1st B. | R | 141 |
| Electric Storage Battery Co. | 1st B. | F | 175 |
| Electric Storage Battery Co. | 1st B. | F | 176 |
| Elite Mfg. Co. | 2d B. | C | 326 |
| Empire Automobile Tire Co. | 1st B. | F | 178 |
| Empire Auto Top Co. | 2d B. | B | 313 |
| Ennis Rubber Mfg. Co. | 2d B. | D | 321 |
| Excelsior Storage Battery Co. | 2d B. | C | 325 |
| F. R. V. Auto Parts Co. | 2d B. | E | 358 |
| Federal Mfg. Co. | 2d B. | F | 367 |
| Fiat Automobile Co. | M.F. | A | 42 |
| Firestone Tire & Rubber Co. | 1st B. | L | 113 |
| Fisk Rubber Co. | 1st B. | J | 117 |
| Flentje, Ernest | 2d B. | C | 334 |
| Ford Motor Co. | M.F. | C | 25 |
| G & J Tire Co. | 1st B. | K | 105 |
| Gaeth Automobile Co. | M.F. | I | 51 |
| Gabriel Horn Mfg. Co. | 1st B. | V | 163 |
| Garage Equipment Co. | 2d B. | A | 305 |
| Geiszler Bros. | 2d B. | A | 307 |
| Gemmer Mfg. Co. | 1st B. | F | 171 |
| General Storage Battery Co. | 2d B. | A | 301 |
| Gilbert Mfg. Co. | 1st B. | V | 158 |
| Gloversville Auto Glove Co. | 2d B. | H | 387 |
| Goodrich Co., B. F. | 1st B. | H | 119 |
| Goodyear Tire & Rubber Co. | 1st B. | M | 109 |
| Grabowsky Power Wagon Co. | 1st B. | D | 219 |
| Gramm-Logan Motor Car Co., The | 1st B. | G | 211 |
| Gray & Davis | 1st B. | K | 104 |
| Gray-Hawley Mfg. Co. | 1st B. | S | 150 |
| Guaranty Faultless Auto Tube Co. | 2d B. | H | 378 |
| Gyroscope Automobile Co. | 1st B. | A | 201 |
| H. & C. Bottle Mfg. Co. | 2d B. | A | 310 |
| Ham Mfg. Co., O. T. | 1st B. | U | 166 |
| Harris Oil Co., A. W. | 1st B. | P | 126 |
| Hartford Rubber Works Co. | 1st B. | J | 115 |
| Hartford Suspension Co. | 1st B. | S | 135 |
| Hart-Kraft Motor Co. | 1st B. | D | 221 |
| Havoline Oil Co. | 2d B. | J | 408 |
| Healy Leather Tire Co. | 2d B. | E | 349 |
| Heinze Electric Co. | 1st B. | P | 132 |
| Herz & Co. | 1st B. | S | 151 |
| Hess-Bright Mfg. Co. | 1st B. | B | 191 |
| High Wheel Auto Parts Co. | 2d B. | G | 352 |
| Hill Mfg. Co. | 2d B. | D | 323 |
| Hoffecker Co., The | 1st B. | B | 184 |
| Holsman Automobile Co. | M.F. | D | 31 |

# GRAND CENTRAL PALACE
## SHOW DIAGRAMS


MAIN FLOOR

SECOND BALCONY

FIRST BALCONY

TOILET
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CYCLE & AUTOMOBILE TRADE JOURNAL
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LEXINGTON AVE.
200
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210
180
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233
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179
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323
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C
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338
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356
RESTAURANT AND CAFE
H
374
378
J
401
409
430
437
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460
461
462
L

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|---|---|---|---|
| Hol Tan Co. | M.F. | A | 45 |
| Horseless Age | M.F. | | 22 |
| Hotchkiss Import Co. | M.F. | A | 44 |
| Hyatt Roller Bearing Co. | 1st B. | K | 102 |
| Hydraulic Oil Storage Co. | 2d B. | B | 315 |
| Inter-State Automobile Co. | 1st B. | H | 208 |
| Isotta Import Co. | M.F. | A | 47 |
| Jackson Automobile Co. | M.F. | D | 36 |
| Jeffery-Dewitt Co. | 2d B. | F | 366 |
| Johnson, Isaac G. & Co. | 2d B. | C | 340 |
| Jones Speedometer Mfg. Co. | 1st B. | V | 160 |
| Keystone Lubricating Co. | 2d B. | D | 320 |
| Kissel Motor Car Co. | 1st B. | C | 223 |
| Kokomo Electric Co. | 1st B. | F | 154½ |
| Lane Motor Vehicle Co. | M.F. | E | 52 |
| Lansden Co., The | 1st B. | A | 210 |
| Lazarnick, Nathan | M.F. | | 20 |
| Lavalette & Co. | 2d B. | F | 370 |
| Leather Tire Goods Co. | 1st B. | B | 187 |
| L. I. Auto Supply Mfg. Co. | 2d B. | C | 328 |
| Light Mfg. & Fdy. Co. | 1st B. | S | 148 |
| Lutz-Lockwood Mfg. Co. | 2d B. | G | 353 |
| Mack Bros. Motor Car Co. | 1st B. | G | 215 |
| Marion Motor Car Co. | M.F. | N | 5 |
| Marko Storage Battery Co. | 2d B. | J | 430 |
| Maxwell-Briscoe Motor Co. | M.F. | C | 27 |
| Maxwell-Briscoe Motor Co. (Annex) | M.F. | E | 57 |
| McCord Mfg. Co. | 1st B. | B | 181 |
| McCue Co., The | 1st B. | C | 226 |
| McIntyre, W. H. Co. | M.F. | E | 56 |
| Merchant & Evans Co. | 2d B. | C | 341 |
| Metzger, C. A. | 1st B. | R | 142 |
| Metal Stamping Co. | 2d B. | B | 314 |
| Michelin Tire Co. | 1st B. | B | 190 |
| Middleby Auto Co. | 1st B. | A | 202 |
| Midland Motor Co. | M.F. | D | 30 |
| Miller, Chas. E. | 1st B. | C | 225 |
| Miller, Wm. P. & Sons | 2d B. | C | 342 |
| Mitchell Motor Car Co. | M.F. | B | 38 |
| Moline Automobile Co. | M.F. | K | 15 |
| Monitor Mfg. Co. | 2d B. | J | 401 |
| Moon Motor Car Co. | M.F. | N | 3 |
| Mora Motor Car Co. | M.F. | D | 29 |
| Morgan & Wright | 1st B. | O | 121 |
| Mosler & Co., A. R. | 1st B. | V | 159 |
| Motor | M.F. | | 11 |
| Motor Accessories Co., The | 2d B. | J | 438 |
| Motor & Accessory Mfrs. | 1st B. | M | 111 |
| Motor Vehicle Publishing Co. | 2d B. | K | 461 |
| Motsinger Device Mfg. Co. | 1st B. | V | 167 |
| Motz Clincher Tire & R. Co. | 1st B. | V | 161 |
| Myers, J. L. & A. J. | 2d B. | C | 344 |
| Nathan Novelty Mfg. Co. | 2d B. | C | 359 |
| National Auto Top Co. | 2d B. | G | 351 |
| National Battery Co. | 1st B. | L | 112 |
| National Carbon Co. | 1st B. | R | 147 |
| National Coil Co. | 1st B. | F | 179 |
| National Motor Vehicle Co. | M.F. | D | 28 |
| National Retail Automobile Dealers' Association | 2d B. | K | 460 |
| National Surety Co. | M.F. | | 17 |
| New Departure Mfg. Co. | 2d B. | J | 407 |
| Newmastic Tire Co. | 1st B. | G | 214 |
| N. E. Automobile Journal | M.F. | | 10 |
| New York Coil Co. | 2d B. | J | 434 |
| Noonan Tool & Mach. Works | 2d B. | J | 405 |
| Nordyke & Marmon Co. | M.F. | N | 4 |
| N. Y. & N. J. Lubricant Co. | 1st B. | P | 131 |
| Oakland Motor Car Co. | M.F. | N | 1 |
| Oliver Mfg. Co. | 1st B. | K | 103 |
| Omar Motor Co. | 1st B. | A | 209 |
| Overland Auto Co. | M.F. | N | 6 |
| Owen, R. M. & Co. (Premier) | M.F. | C | 26 |
| Palais de l'Automobile | M.F. | A | 43 |
| Panhard & Levassar | M.F. | B | 40 |
| Pantasote Co., The | 1st B. | B | 189 |
| Pennsylvania Auto-Motor Co. | M.F. | M | 12 |
| Pennsylvania Rubber Co. | 1st B. | S | 133 |
| Perfection Wrench Co. | 2d B. | J | 403 |
| Phila. Timer & Machine Co. | 2d B. | G | 354 |
| Pittsburgh Motor Vehicle Co. | 1st B. | G | 217 |
| Pittsfield Spark Coil Co. | 1st B. | B | 180 |
| Pneu l'Electric Co. | 2d B. | G | 345 |
| Polson, W. F. | 2d B. | A | 303 |
| Quincy, Manchester, Sargent Co. | 2d B. | C | 335 |
| R. I. V. Co., Inc. | 2d B. | F | 373 |
| Randall Faichney Co. | 1st B. | W | 156 |
| Raimes & Co. | 2d B. | J | 410 |
| Rands Mfg. Co. | 1st B. | P | 125 |
| Rapid Motor Vehicle Co. | 1st B. | E | 213 |
| Reeves, Paul & Son | 2d B. | | 356 |
| Regal Motor Car Co. | M.F. | E | 55 |
| Reliable Dayton Motor Car Co. | 1st B. | A | 200 |
| Reliance Motor Truck Co. | 1st B. | G | 216 |
| Remy Electric Co. | 1st B. | B | 186 |
| Renault Freres Sell. Branch | M.F. | A | 46 |
| Reo Motor Car Co. | M.F. | C | 24 |
| Republic Rubber Co. | 1st B. | B | 188 |
| Royal Equipment Co. | 2d B. | C | 330 |
| Rubly Mfg. Co. | 2d B. | J | 437 |
| Rushmore Dynamo Works | 2d B. | G | 347 |
| Safety Device Co. | 2d B. | F | 368 |
| Sager Co., J. H. | 1st B. | R | 145 |
| Salman, John A. & Co. | 2d B. | J | 402 |
| Samson Leather Tire Co. | 2d B. | C | 344 |
| Schacht Mfg. Co. | 1st B. | C | 224 |
| Seamless Rubber Co. | 2d B. | A | 302 |
| Shaler Co., C. A. | 1st B. | T | 153 |
| Sharp Arrow Automobile Co. | 1st B. | F | 231 |
| Shelby Steel Tube Co. (Mr. H. A. Flagg) | 1st B. | J | 118 |
| Sherman, Geo. S. | 2d B. | J | 443 |
| Shore Instrument & Mfg. Co. | 2d B. | J | 406 |
| Sier Bath Co. | 2d B. | J. | 441 |
| Simplex Motor Car Co. | M.F. | D | 34 |
| Sireno Co. | 2d B. | C | 329 |
| Smith Co., A. O. | 1st B. | S | 134 |
| Smith Mfg. Co., I. J. | 2d B. | H | 376 |
| Snell, Irving | 2d B. | F | 365 |
| Spare Motor Wheel of America, Ltd. | 2d B. | A | 311 |
| S. B. Specialty Co., The | 2d B. | J | 440 |
| Speedwell Motor Car Co. | 1st B. | A | 205 |
| Spicer Universal Joint Mfg. Co. | 1st B. | P | 130 |
| Splitdorf & Co., C. F. | 1st B. | K | 107 |
| Sprague Umbrella Co. | 1st B. | U | 167 |
| Standard Leather Washer Mfg. Co. | 2d B. | D | 322 |
| Standard Roller Bearing Co. | 1st B. | W | 155 |
| Standard Welding Co. | 1st B. | O | 124 |
| Stanley & Patterson | 2d B. | F | 371 |
| Stewart & Clark Mfg. Co. | 1st B. | R | 143 |
| Stromberg Motor Device Co. | 2d B. | A | 304 |
| Sultan Motor Co. | 1st B. | C | 227 |
| Swinehart Clincher Tire and Rubber Co. | 1st B. | S | 137 |
| Timken Roller Bear'g Axle Co. | 1st B. | M | 110 |
| Travelers' Insurance Co. | M.F. | | 19 |
| Travers Blowout Patch Co. | 2d B. | C | 336 |
| Troy Carriage Sun Shade Co. | 2d B. | G | 350 |
| Union Battery Co. | 2d B. | J | 409 |
| U. S. McAdamite Metal Co. | 2d B. | L | 462 |
| Vanguard Mfg. Co. | 2d B. | F | 364 |
| Veeder Mfg. Co. | 1st B. | L | 114 |
| Warner Gear Co. | 1st B. | R | 138 |
| Warner Instrument Co. | 1st B. | S | 136 |
| Wayne Works | 1st B. | A | 208 |
| Weed Chain Tire Grip Co. | 1st B. | F | 177 |
| Welch Motor Car Co. | M.F. | J | 16 |
| Westchester Appliance Co. | 1st B. | F | 173 |
| Wetherill Finished Casting Co. | 2d B. | F | 369 |
| Wheeler, F. H. | 1st B. | V | 165 |
| Whitney Mfg. Co. | 1st B. | K | 106 |
| Wilkinson Co., John S. | 2d B. | E | 362½ |
| Willet Engine & Carbur. Co. | 2d B. | J | 442 |
| Wilson Trading Co. | 2d B. | J | 412 |
| Witherbee Igniter Co. | 1st B. | R | 146 |
| York Auto Wheel Co. | 2d B. | J | 439 |
| York Motor Car Co. | M.F. | E | 43 |
| Y. M. C. A. | 2d B. | L | 463 |
| Zeglene Bullet Proof Cloth Co. | 2d B. | A | 306 |

# Madison Square Garden Show

## ALPHABETICAL LIST AND LOCATION OF EXHIBITORS

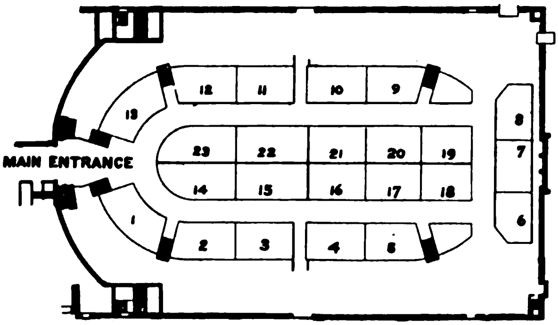
(Diagram on following page)

### LIST OF ABBREVIATIONS.

| | |
|---|---|
| M.F. | Main Floor. |
| E.P. | Elevated Platform. |
| E.H. | Exhibition Hall, Madison Ave. Front. |
| B. | Basement. |
| Ba. | Balcony. |
| C.H. | Concert Hall. |
| S.T. | Second Tier Boxes. |
| T.T. | Third Tier Boxes. |

| | | |
|---|---|---|
| Ajax-Grieb Rubber Co. | E.P. | 134 |
| Allen Auto Specialty Co. | Ba. | 207 |
| Allers, H. A. & Co. | S.T. | 405 |
| American Ball Bearing Co. | E.P. | 164 |
| American British Mfg. Co. | C.H. | 324 |
| American Elec. Nov. & Mfg. Co. | E.P. | 110 |
| American Elec. Fuse Co. | T.T. | 431 |
| Amer. Motor Co. | B. | 535 |
| Amer. Thermos Bottle Co. | Ba. | 228 |
| Amer. Thermos Ware Co. | B. | 514 |
| Anderson Carriage Co. | E.H. | 54 |
| Anderson Forge & Mach. Co. | Ba. | 246 |
| Apple Elec. Co. | Ba. | 217 |
| Apperson Bros. Auto Co. | E.P. | 32 |
| Atlas Rubber Co. | Ba. | 239 |
| Atwater-Kent Mfg. Wks | E.P. | 117 |
| Atwood-Castle Co. | E.P. | 156 |
| Aurora Automatic Mach. Co. | B. | 542 |
| Austro-American Separator Co. | Ba. | 224 |
| Auto-Bi Co. | B. | 545 |
| Autocar Co. | M.F. | 7 |
| Autocoil Co. | E.P. | 123 |
| Auto Improvement Co. | E.P. | 109 |
| Automobile Topics | B. | 519 |
| Auto Pump Co. | Ba. | 219 |
| Auto Supply Mfg. Co. | B. | 516 |
| Auto Tire Inflator Co. | T.T. | 430 |
| Avery Portable Lighting Co. | E.P. | 145 |
| A-Z Co. | Ba. | 230 |
| Babcock Elec. Carriage Co. | E.H. | 55 |
| Badger Brass Mfg. Co. | E.P. | 165 |
| Bailey, S. R. & Co., Inc. | E.H. | 53 |
| Baker, F. A. & Co. | B. | 537 |
| Baker Motor Vehicle Co | E.H. | 57 |
| Baldwin Chain Mfg. Co. | E.P. | 118 |
| Benford, E. M. | Ba. | 222 |
| Bicycling World Co. | B. | 539 |
| Bosch Magneto Co. | S.T. | 400-3 |
| Bottle, H. & C. | T.T. | 439 |
| Bowser, S. F. & Co. | E.P. | 113 |
| Brennan Mfg. Co. | E.P. | 160 |
| Bretz, J. S. Co. | Ba. | 214 |
| Brictson, A. O. | T.T. | 440 |
| Briscoe Mfg. Co. | E.P. | 107 |
| Brown-Lipe Gear Co. | E.P. | 105 |
| Buda Fdry. & Mfg. Co. | Ba. | 242 |
| Burnet Compound Spring Co. | Ba. | 241 |
| Burrows, E. T. Co. | B. | 508 |
| Byrne, Kingston & Co. | E.P. | 157 |
| Cadillac Motor Car Co. | M.F. | 4 |
| Caloris Mfg. Co. | S.T. | 418 |
| Chalmers-Detroit Motor Co. | M.F. | 17 |
| Champion Wagon Co. | B. | 77 |
| Champion Ignition Co. | Ba. | 240 |
| Champion, Albert Co. | B. | 507 |
| Chandler Co., Inc., The | E.P. | 141 |
| Chase, L. C. & Co. | C.H. | 301 |
| Chicago Wind Shield Co. | S.T. | 420 |
| Class Jour. Co. | B. | 505 |
| Coes Wrench Co. | C.H. | 320 |
| Columbia Lubricants Co. of N. Y. | C.H. | 303 |
| Columbia Nut & Bolt Co. | S.T. | 404 |
| Comptoir D'Innovations Pour Auto. | B. | 557 |
| Conn. Tel. & Elec. Co. | E.P. | 128 |
| Consolidated Mfg. Co. | B. | 531 |
| Consolidated Rubber Tire Co. | E.P. | 136 |
| Continental Caoutchouc Co. | E.P. | 130 |
| Cooks, Adam, Sons | E.P. | 144 |
| Cook's Standard Tool Co. | Ba. | 204 |
| Corbin Motor Vehicle Co. | M.F. | 9 |
| Cormack, M. H. & Co. | Ba. | 247 |
| Cowles, C. & Co. | C.H. | 319 |
| Cramp, Wm. & Sons Ship & Engine Bldg. Co. | E.P. | 158 |
| Crouch Motor Co. | B. | 554 |
| Curtiss, G. H. Mfg. Co. | B. | 550 |
| Cycle & Automobile Trade Journal. | B. | 515 |
| Davis-Bournonville Co. | S.T. | 411-12 |
| Diamond Chain & Mfg. Co. | E.P. | 167 |
| Diamond Rubber Co. | E.P. | 101 |
| Dietz, R. E. Co. | E.P. | 116 |
| Dixon, Jos. Crucible Co. | E.P. | 174 |
| Dow Tire Co. | E.P. | 126 |
| Downing, C. J. | B. | 502 |
| Duffy Grease Co. | S.T. | 417 |
| Duff Mfg. Co., The | E.P. | 140 |
| Eastern Carbon Works | Ba. | 206 |
| Eclipse Machine Co. | B. | 551 |
| Economizer, G. L. Co. | B. | 556a |
| Edmund & Jones Mfg. Co. | C.H. | 313 |
| Electric Vehicle Co. | M.F. | 12 |
| Electric Vehicle Co. | E.H. | 51 |
| Elec. Storage Battery Co | C.H. | 315 |
| Elite Mfg. Co. | T.T. | 429 |
| Elmore Mfg. Co. | M.F. | 3 |
| Empire Auto Tire Co. | E.P. | 122 |
| English & Mersick Co. | Ba. | 221 |
| Erie Foundry Co. | S.T. | 414 |
| Everitt-Metzger-Flanders Co. | M.F. | 8 |
| Excelsior Supply Co. | B. | 532 |
| Faultless Auto Tube Co. | B. | 566 |
| Firestone Tire & Rubber Co. | E.P. | 149 |
| Fisk Rubber Co. | E.P. | 166 |
| Flentje, Ernst | S.T. | 415 |
| Fox Metallic Tire Belt Co. | E.P. | 146 |
| Franklin, H. H. Mfg. Co. | M.F. | 18 |
| Franklin, H. H. Mfg. Co. | B. | 78 |
| Franklin, H. H. Mfg. Co. | Ba. | 232 |
| Garvin Machine Co. | B. | 565 |
| G & J Tire Co. | E.P. | 106 |
| Geiszler Bros. | Ba. | 248 |
| Gemmer Mfg. Co. | C.H. | 318 |
| General Vehicle Co. | B. | 76 |
| Gilbert Mfg. Co. | E.P. | 108 |
| Globe Machine & Stamp Co. | E.P. | 147 |
| Goodrich, B. F. Co., The | E.P. | 100 |
| Goodyear Tire & Rubber Co., The. | E.P. | 103 |
| Gray & Davis | E.P. | 114 |
| Ham, C. T. Mfg. Co. | E.P. | 176 |
| Hardy, R. E. Co. | E.P. | 133 |
| Harley-Davidson Motor Co. | B. | 544 |
| Harris, A. W. Oil Co. | E.P. | 159 |
| Hartford Rubber Wks. Co. | E.P. | 171 |
| Hartford Suspension Co. | E.P. | 152 |
| Havoline Oil Co. | Ba. | 216 |
| Haws, Geo. A. | Ba. | 201 |
| Haynes Auto Co. | E.P. | 25 |
| Healy Leather Tire Co. | B. | 501 |
| Hess-Bright Mfg. Co. | C.H. | 304 |

# MADISON SQUARE GARDEN SHOW DIAGRAMS.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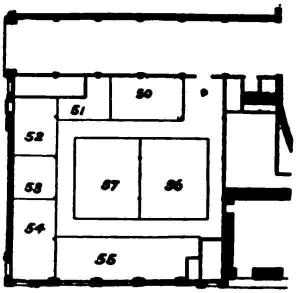
MAIN EXHIBITION HALL.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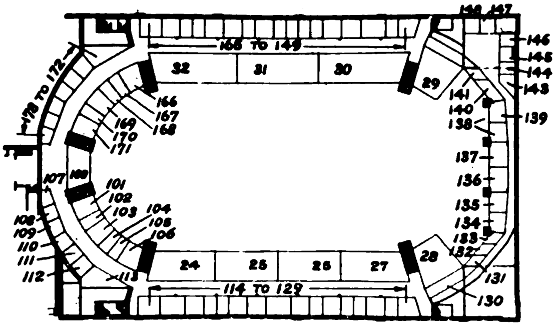
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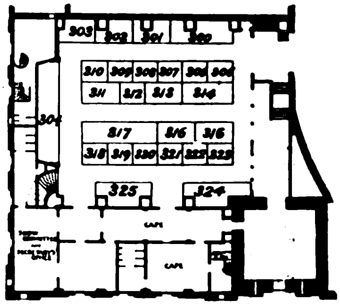
ELEVATED PLATFORM.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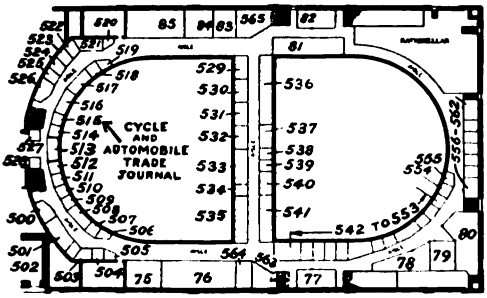
CONCERT HALL.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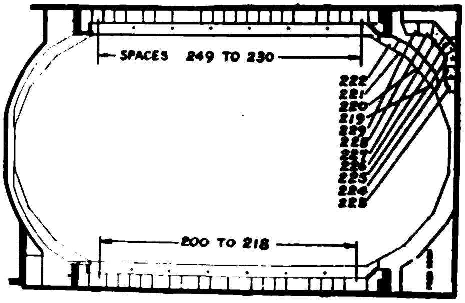
BASEMENT.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BALCONY.

| | | |
|---|---|---|
| Heinze Elec. Co. | E.P. | 175 |
| Hendee Mfg. Co. | B. | 536 |
| Herz & Co. | E.P. | 112 |
| Hewitt Motor Co. | E.P. | 27 |
| Hewitt Motor Co. | B. | 85 |
| High Frequency Ignition Oil Co. | Ba. | 231 |
| Hill Dryer Co. | B. | 513a |
| Hoffecker Co., The | C.H. | 308 |
| Hopewell Bros. | Ba. | 213 |
| Horn, Gabriel Mfg. Co. | E.P. | 173 |
| Hornecker Motor Mfg. Co. | B. | 543 |
| Horseless Age | B. | 506 |
| Hyatt Roller Bearing Co. | E.P. | 178 |
| Hydraulic Oil Storage Co. | Ba. | 212 |

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|---|---|---|
| Janney-Steinmetz & Co. | E.P. | 148 |
| Jarman & Baker | Ba. | 237 |
| Jeffery-Dewitt Co. | Ba. | 208 |
| Johnson, Isaac & Co. | Ba. | 218 |
| Jones, Phineas & Co. | E.P. | 162 |
| Jones Speedometer | E.P. | 127 |

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|---|---|---|
| Keystone Lubricating Co. | Ba. | 233 |
| King, Julius Optical Co. | B. | 510 |
| Kitsee Storage Battery Co. | B. | 503 |
| Knox Automobile Co. | M.F. | 1 |
| Knox Automobile Co. | B. | 75 |
| K-W Ignition Co. | Ba. | 223 |

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|---|---|---|
| Lavalette & Co. | B. | 517 |
| Leather Tire Goods Co. | E.P. | 143 |
| Light Mfg. & Foundry Co. | E.P. | 121 |
| Livingston Radiator Co. | B. | 511 |
| Locomobile Co. of America | M.F. | 19 |
| Lozier Motor Co. | M.F. | 11 |
| Lucas, John & Co. | T.T. | 438 |
| Lunkenheimer Co., The | C.H. | 306 |
| Lux Auto Lamp Mfg. Co., The | T.T. | 442 |

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|---|---|---|
| Manhattan Screw & Stamping Wks | C.H. | 316 |
| Mann, Leon Co. | Ba. | 234 |
| Manufacturers' Foundry Co. | E.P. | 154 |
| Marko Storage Battery Co. | T.T. | 444 |
| Matheson Motor Car Co. | M.F. | 2 |
| McCord Mfg. Co. | Ba. | 200 |
| Merchant & Evans Co. | B. | 524 |
| Merkel Light Motor Co. | B. | 529 |
| Mesinger, H. & F. Mfg. Co. | B. | 549 |
| Metal Stamping Co. | Ba. | 211 |
| Mezger, C. A., Inc. | C.H. | 323 |
| Mica Core Mfg. Co. | T.T. | 427 |
| Michelin Tire Co. | E.P. | 142 |
| Miller, Chas. E. | Ba. | 243 |
| Miller, Wm. P. Sons | Ba. | 249 |
| Morgan & Wright | E.P. | 129 |
| Morrison-Ricker Mfg. Co. | Ba. | 209 |
| Mosler, A. R. & Co. | E.P. | 172 |
| Motorcycle Publishing Co. | B. | 534 |
| Motor Car Equipment Co. | B. | 547 |
| Motor | B. | 527 |
| Motsinger Device Mfg. Co. | E.P. | 155 |
| Motz Clincher T. & R. Co. | B. | 525 |
| Mutty, L. J. Co. | Ba. | 229 |

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|---|---|---|
| Nadall Mfg. Co. | T.T. | 428 |
| National Battery Co. | C.H. | 307 |
| National Carbon Co. | C.H. | 305 |
| Nathan Novelty Mfg. Co. | B. | 559 |
| Never Miss Spark Plug Co. | C.H. | 321 |
| New Departure Mfg. Co. | B. | 521 |
| New Era Gas Engine Co. | B. | 552 |
| New York Coil Co. | Ba. | 226 |
| New York & N. J. Lubricant Co. | E.P. | 119 |
| New York Sporting Goods Co. | Ba. | 210 |
| Noera Mfg. Co. | C.H. | 302 |
| Noonan Tool & Mach. Wks | B. | 560 |
| N. S. U. Motor Co. | B. | 533 |
| Oliver Mfg. Co. | E.P. | 150 |
| Ovington Motor Co. | B. | 540 |

| | | |
|---|---|---|
| Packard Motor Car Co. | M.F. | 14 |
| Pantasote Co., The | C.H. | 314 |
| Patterson, Gottfried & Hunter | B. | 500 |
| Peerless Motor Car Co. | M.F. | 23 |
| Penn Rubber Co. | E.P. | 153 |
| Perfection Spring Co. | B. | 518 |
| Perfection Wrench Co. | S.T. | 413 |
| Persons Mfg. Co. | B. | 555 |
| Phila. Storage Battery Co. | B. | 563 |
| Phila. Timer & Mach. Co. | Ba. | 236 |
| Pierce Cycle Co. | B. | 538 |
| Pierce, George N. Co. | M.F. | 15 |
| Pierson Motor Supply Co. | Ba. | 215 |
| Pittsfield Spark Coil Co. | E.P. | 168 |
| Pope Mfg. Co. | M.F. | 20 |
| Pope Motor Car Co. | M.F. | 5 |
| Post & Lester Co. | B. | 526 |
| Pratt & Whitney Co. | B. | 561 |
| Pubilcation Automobilia, Ltd. | B. | 520 |

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|---|---|---|
| Quincy, Manchester, Sargent Co. | T.T. | 443 |

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|---|---|---|
| Rands Mfg. Co. | C.H. | 325 |
| Randall-Faichney Co. | C.H. | 312 |
| Rauch & Lang Carriage Co., The | E.H. | 52 |
| Reading Standard Co. | B. | 541 |
| Reeves, Paul S. & Son | S.T. | 407 |
| Reliance Motor Cycle Co. | B. | 553 |
| Remy Electric Co. | E.P. | 125 |
| Republic Rubber Co. | E.P. | 139 |
| Rielly, P. & Son | Ba. | 235 |
| Robinson, Wm. C. & Sons Co. | Ba. | 203 |
| Rose Mfg. Co. | E.P. | 169 |
| Royal Motor Car Co. | M.F. | 6 |
| Rushmore Dynamo Works | Ba. | 220 |
| R. I. V. Co. | Ba. | 238 |

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|---|---|---|
| Sager, J. H. Co. | E.P. | 132 |
| Sampson, Alden, 2d | B. | 84 |
| Sampson Leather Tire Co. | S.T. | 409-10 |
| Seamless Rubber Co. | S.T. | 408 |
| Selden Motor Vehicle Co. | E.P. | 24 |
| Shaler, C. A. Co. | B.A. | 202 |
| Smith, A. C. Co. | Ba. | 205 |
| Shelby Steel Tube Co. | E.P. | 104 |
| Simplex Auto Co. | E.P. | 26 |
| Sireno Co., The | S.T. | 416 |
| Smith, A. C. Co. | Ba. | 205 |
| Spicer Universal Joint Mfg. Co. | E.P. | 131 |
| Splitdorf, C. F. | E.P. | 102 |
| Sprague Umbrella Co. | C.H. | 300 |
| Springfield Metal Body Co. | C.H. | 317 |
| Standard Leather Washer Mfg. Co. | T.T. | 441 |
| Standard Roller Bearing Co. | C.H. | 311 |
| Standard Welding Co. | E.P. | 163 |
| Stanley & Patterson | B. | 522 |
| Stearns, F. B. Co. | M.F. | 13 |
| Stevens-Duryea Co. | M.F. | 22 |
| Stewart & Clark Mfg. Co. | C.H. | 322 |
| Stromberg Motor Devices Co. | B. | 509 |
| Studebaker Auto Co. | B. | 81 |
| Studebaker Auto Co. | M.F. | 10 |
| Studebaker Auto Co. | E.H. | 56 |
| Swinehart Clincher T. & R. Co. | E.P. | 124 |

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|---|---|---|
| Thiem Mfg. Co. | B. | 546 |
| Thomas, E. R. Motor Co. | M.F. | 16 |
| Thomas, E. R. Motor Co. | B. | 82 |
| Timken Roller Bearing Axle Co. | E.P. | 151 |
| Traver Blowout Patch Co. | S.T. | 406 |
| Trenton Rubber Mfg. Co. | Ba. | 244 |
| Troy Car. Sun Shade Co., The | B. | 564 |

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|---|---|---|
| Union Battery Co. | S.T. | 419 |

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|---|---|---|
| Vacuum Oil Co. | E.P. | 111 |
| Valentine & Co. | E.P. | 177 |
| Vanguard Mfg. Co. | B. | 523 |
| Veeder Mfg. Co., The | E.P. | 115 |
| Vehicle Apron & Hood Co. | B. | 513 |
| Vesta Accumulator Co. | T.T. | 425 |
| Vorhees Rubber Mfg. Co. | Ba. | 227 |

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|---|---|---|
| Walter Automobile Co. | E.P. | 28 |
| Walton Motor Co., Inc. | B. | 548 |
| Warner Gear Co. | E.P. | 161 |
| Warner Instrument Co. | E.P. | 120 |
| Waverly Co., The | E.H. | 50 |
| Weed Chain Tire Grip Co. | E.P. | 135 |
| Westchester Appliance Co. | C.H. | 309 |
| Wheeler, F. H. | E.P. | 137 |
| White Co., The | E.P. | 30 |
| White & Bagley Co., The | B. | 512 |
| Whitney Mfg. Co. | E.P. | 170 |
| Winn, Wm. R. | Ba. | 225 |
| Winton Motor Carriage Co. | M.F. | 21 |
| Witherbee Igniter Co. | E.P. | 138 |
| Woods Motor Veh. Co. | E.P. | 29 |

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|---|---|---|
| Young, O. W. | Ba. | 245 |

# Trade News Items

President F. F. C. Young, of the Jos. Dixon Crucible Co., Jersey City, N. J., died December 6th.

The receiver of the Royal Motor Car Co., of Cleveland, Ohio, has been dismissed and a new organization known as the Royal Tourist Car Co. has been effected, which will immediately start operations.

The Annual Convention of Maxwell Automobile Dealers, which has become a regular institution in connection with the shows of the A. M. C. M. A., will be held on Tuesday, January 5th, at Hotel Manhattan.

Acheson Oildag Co., of Niagara Falls, N. Y., manufacturers of "Oildag," a lubricant consisting of defloculated unctuous Acheson Graphite, permanently suspended in mineral oil, report that a Packard car has been run 700 miles on a gallon of "Oildag" and a Duryea runabout nearly 3,000 miles on a gallon.

The General Mfg. Co., of Elkhart, Ind., are manufacturing a standard line of cone clutches and selective type transmissions. Their bulletins Nos. 5 and 6 have come to hand illustrating these products. They are also bringing out two sizes of planetary transmissions. Their line will be described in a future issue of "The Journal."

The Autocoil Company, 136 Seventh St., Jersey City, N. J., announces that hereafter all autocoils will be manufactured and sold under United States Letters Patent No. 878435, of February 4, 1908, to Richard Varley, and No. 884116, of April 7, 1908, to E. Q. Williams, by license acquired from The Unit Coil Company.

Ernest H. Brandt, general manager of the Detroit-Cadillac Motor Car Co., of New York City, has resigned to accept a position as manager of the Eastern distributing depot of Thomas B. Jeffery & Co., of Kenosha, Wis. His headquarters are in the Rambler Building, 38 West 62nd St., New York City.

A Fritchle electric car, made by Fritchle Automobile & Battery Co., 1455 Clarkson street, Denver, Colorado, recently made the run from New York to Philadelphia on one charge of the battery, covering 108 miles altogether. This run completed 1800 miles of a tour which Oliver Fritchle, head of the company, is making with the car.

The Nathan Novelty Manufacturing Co., 84-90 Reade Street, New York, has recently sold to the Allen Auto Specialty Co., patent number 789662 dated September 19, 1905, issued to Benjamin Nathan for tire covers having reversed overlaps with suitable means for fastening, and has ceased to manufacture and sell the said tire cover.

The C. N. Cady Co., Canastota, N. Y., advises us that it has received an order from the Atlantic Co., of Amesburg, Mass., for 800 motors.

The Racine Mfg. Co., of Racine, Wis., is again enlarging its plant. Two large four-story brick buildings are now ready for occupancy and foundations are being laid for a third new one.

The Bendix Automobile Co., which is moving its plant from Chicago to Logansport, Ind., has recently been capitalized at $400,000. Of the capital stock, $75,000 of it was subscribed by citizens of Logansport.

Harry S. Houpt, of New York, has taken over the entire output of the Herreshoff Motor Co., of Detroit, Mich., for the coming year. The Herreshoff will be a shaft driven, four cylinder, 24 horse power car. The motor it is said will allow of speed variations from 200 to 2,400 revolutions in actual service.

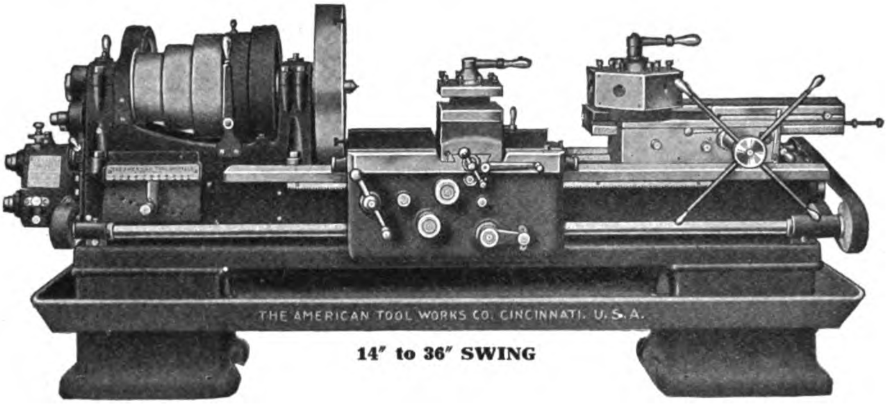
C. Royce Hough, formerly factory manager of the Pope Manufacturing Co., Indianapolis, Ind., and later sales manager of the Motor Car Co., of Washington, D. C., has accepted position as general manager of Fickling & Co., 304 W. 49th St., New York City.

On Tuesday evening, December 15th, at 9 o'clock, the "Grand Prize" Gold Cup was presented to the American representative of the Fiat Automobile Company whose car, driven by Wagner, was the winner of the "Grand Prize" race of the Automobile Club of America. The presentation took place in the large assembly room of the A. C. A. Club House on West 54th St., New York City.

Mr. Emerson Brooks, Vice-President of J. M. Quinby & Co., of Newark, N. J., at a luncheon of Grand Central Place exhibitors, drew first lot and won the privilege of exhibiting an automobile in the Breslin Hotel, Broadway and 29th Streets, during the Palace Show, and announced that he would exhibit a "Pennsylvania" car for which his company is agent in New York City and New Jersey.

R. E. Hardy Co., New York City, have again outgrown their quarters and have leased of the Bush Terminal Co. space in one of their large steel and concrete buildings, at 37th street and New York Harbor, Brooklyn. This gives them three times as much space as they formerly had for the manufacture of the Sta Rite spark plug and other ignition specialties. Their office and factory address is now 301 Thirty-seventh street, Brooklyn, but a New York office will be continued at 25 W. 42nd street.

# 1909 SHOP EQUIPMENT


THE AMERICAN TOOL WORKS CO. CINCINNATI. U.S.A.

14″ to 36″ SWING

## "AMERICAN" TURRET LATHES

Are built for the Most Severe Service in your plant. Are **NOTED** for their Power, Accuracy and Ease of Operation. Quick Change Feeding and Screw-Cutting Mechanism regularly furnished. Lumen Bronze Spindle Bearings. Steel Gears where needed Screw-Cutting Feature omitted if so desired. Automatic Stop and Turret on Carriage can be supplied. Turret Tool Post, Automatic Turret on Shears and Friction Head shown above.

**LATHES** **PLANERS**

**BELT DRIVEN**

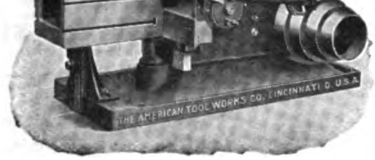
# "AMERICAN"

**MOTOR DRIVEN**

**SHAPERS** **DRILLS**

**Tools Best Adapted** to operating on **Chrome Nickel Steel,** permitting of **High Speeds** and **Heavy Feeds.**

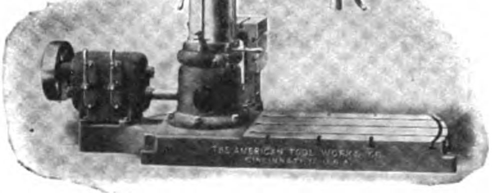
Send for Test Sheets and Catalog "A."


THE AMERICAN TOOL WORKS CO. CINCINNATI O. U.S.A.

15″, 16″, 18″, 21″, 24″, 28″ stroke

## CRANK SHAPERS

**Powerful Stroke, Quick Return, Large Keyseating Capacity, Taper Gib Adjustments, Telescopic Elevating Screw.**


THE AMERICAN TOOL WORKS CO. CINCINNATI O. U.S.A.

2″, 2½″, 3″, 3½″, 4″, 5″, 6″, 7″ Arms

## HIGH SPEED RADIALS

Positive Geared Feeds, Wide Range of Spindle Speeds, Scientific Lubrication, Tapping Attachment on head. Investigate our **New High-Speed "Sensitive" Radial Drill.**

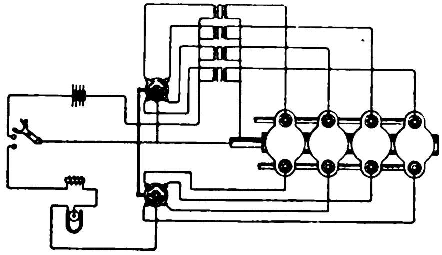
**SIMPLICITY - - POWER - - ACCURACY - - DURABILITY**

# The American Tool Works Company

**400-450 EAST NEW STREET - - - - - - - CINCINNATI, OHIO**

## THE APPERSON PATENT ON DUAL IGNITION

Elmer Apperson, President of the Apperson Bros. Automobile Company, Kokomo, Ind., has recently been granted a patent on the Dual Ignition System for automobile motors, and has further acquired the patent by Ferdinand E. Canda, No. 607806, granted January 17, 1899. The Apperson patent is No. 905625, granted December 1, 1908. These patents cover most broadly the use of two or more separate circuits, with means for throwing the ignition devices into or out of action simultaneously or independently, as well as covering the use of two or more sparking plugs or spark points having electrical connection with the magneto and battery, and means for throwing the spark plugs or spark points into and out of operation.



The Apperson Company reports that experts who have examined the patents consider them among the broadest bearing upon automobile construction and equipment. This Company claims to be the first in America to use what is commonly termed the double independent system of ignition. As the Canda patent interfered with the desired Apperson patent, for which Mr. Elmer Apperson had made application, this patent was purchased.

It is said that although a very large majority of the manufacturers of automobiles are now using a system of ignition that is an infringement of the Apperson patent it was not until the last patent, No. 905625 was granted, Dec. 1st, that he was in a position to protect his interests thereunder, and steps have already been taken by the Apperson interests to notify all manufacturers of, importers of and dealers in, automobiles in America of the existence of the patents in question. The accompanying drawing is a reproduction of the wiring system contained in the Apperson patent, No. 905625, and the following are the five claims allowed in this patent:

1. An explosion engine having a cylinder in which the explosion is adapted to ignite, a pair of spark plugs extending into the cylinder, a magneto, electrical connections from the magneto to one of the spark plugs, a battery, separate electrical connections from the battery to the second spark plug, and a switch for throwing the spark plugs into and out of operation.

2. An explosion engine having a cylinder in which the explosive is adapted to ignite, a pair of spark plugs extending into the cylinder, one of said spark plugs having a fixed spark gap, a magneto electrically connected with one of the spark plugs, a battery electrically connected with the other spark plug, a periodic circuit interrupter in the connection to the spark plug having the fixed gap, and means to control the connections to the spark plugs.

3. An explosion engine having an explosion chamber with two spark plugs therein, a magneto electrically connected with one spark plug, a battery electrically connected with the other spark plug, adjustable timers in the respective circuits, and means for adjusting the timers similarly and simultaneously.

4. An explosion engine having a cylinder in which the explosive is adapted to ignite, a pair of permanent spark gaps within said cylinder, a magneto electrically connected to the terminals of one spark gap, a battery electrically connected to the terminals of the other spark gap, and circuit interrupting devices in each of said connections.

5. An explosion engine having a cylinder in which the explosive is adapted to ignite, a pair of spark plugs extending into the cylinder, a magneto in circuit with one of said spark plugs, an induction coil having its secondary in circuit with the other spark plug, and a battery in circuit with the primary of said induction coil.

## THE INDUSTRIAL INSTRUMENT CO.

The Standard Gauge Mfg. Co., until recently of Syracuse, N. Y., and now located at Foxboro, Mass., has sent out the first official announcement regarding the organization of the Industrial Instrument Co. This concern was recently organized by men who have been engaged in the manufacture of measuring instruments, the leaders being Messrs. B. B. Bristol, E. H. Bristol, and W. E. Goodyear, all of Waterbury, Conn., and for many years prime movers in the Bristol Company. Messrs. Bristol, with several of their coworkers, withdrew from that Company last spring, to develop a plan of larger scope and broader aims than was possible in that organization.

The new concern was incorporated with an authorized capital stock of $2,000,000, and now owns the entire capital stock of the Standard Gauge Mfg. Co., and the Standard Electric Time Co., of Waterbury, Conn. The officers of the Industrial Instrument Co. are: President, Bennett B. Bristol, formerly secretary and treasurer of the Bristol Company; Vice-President, Walter W. Patrick, until recently manager of the New York office of The Bristol Company; Secretary, Henry P. Dennis, formerly manager of Chicago office of The Bristol Company; Treasurer, Arthur F. Mundy, secretary and general manager of the Standard Gauge Manufacturing Company. The Home office will be located at Foxboro, Mass., with sales offices at 50 Church Street, Hudson Terminal, New York, and 752 Monadnock Building, Chicago.

## WHO MAKES TWO-CYCLE AIR COOLED MOTORS?

Judging from the number of inquiries received at this office it is quite evident that the demand for two-cycle air cooled motors is growing steadily. We have on our lists very few makers of this type of motor and we are desirous of adding to that list any maker of such motors not already on it. Will manufacturers of two-cycle air cooled motors kindly communicate with us, so that we will be sure to have their names on our list?

The Half-Nelson Tire Co., Minneapolis, Minn., have made a reduction of 25 per cent. from the retail price of their Emergency automobile tires. They have discontinued selling through dealers and now sell to users direct; hence the reduction in price.

# BUYING IGNITION MATERIAL IS A MATTER OF CONFIDENCE

HERZ IGNITION MATERIAL HAS BEEN THE **BEST** THESE LAST 15 YEARS. NO EXPERIMENTS.

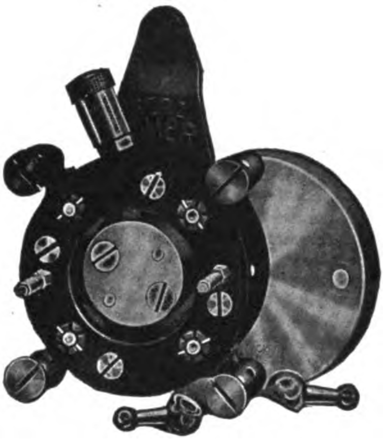
## HERZ
BALL-BEARING
## TIMER

THE ONE ALWAYS DEPENDABLE AND RELIABLE CIRCUIT-BREAKER.

TOOL STEEL
VS.
TOOL STEEL.

NO LOOKING AFTER.

NO REPAIRS.



## HERZ
BALL-BEARING
## TIMER

OVER 100,000 IN CONSTANT USE.

SAVES 25% ON GASOLINE.

RUNS PACKED WITH GREASE.

SEE THE 12 DIFFERENT TYPES AT THE SHOWS.

## HERZ-PLUG
BOUGIE MERCEDES.

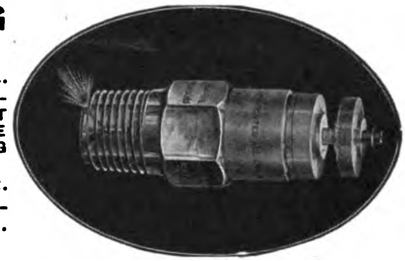
THE BEST AND MOST RELIABLE PLUG MADE.

THE DOUBLE STONE INSULATION ALONE PUTS IT INTO A CLASS FAR ABOVE THE BEST PORCELAIN PLUG

PORCELAIN CRACKS, THIS STONE NEVER.

ABSOLUTELY GUARANTEED FOR ONE YEAR.

**$1.50**



## HERZ-PLUG
BOUGIE MERCEDES

ABSOLUTELY SELF-CLEANING.

ABSOLUTELY PROOF AGAINST SOOT OR OIL, NEEDS NEVER BE TAKEN OUT OF MOTOR.

THE BEST VALUE IN SPARK PLUGS EVER OFFERED. POSTPAID EVERYWHERE.

**$1.50**

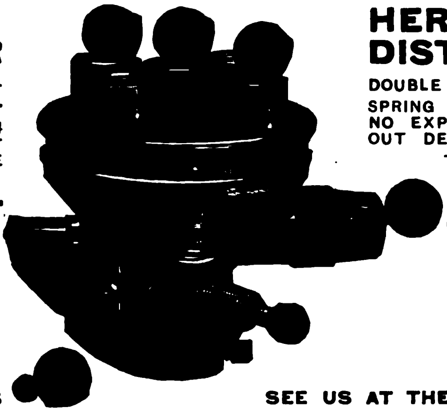
## HERZ DISTRIBUTOR

THE SMALLEST MOST COMPACT INSTRUMENT MADE.

WITH A SINGLE COIL AND 4 PLUGS, IT GIVES THE MOST COMPLETE AND RELIABLE IGNITION OUTFIT.

SEE OUR NEW BALL BEARING
**ROLLER TIMER**
AT THE SHOWS

SEE US AT THE SHOWS



## HERZ DISTRIBUTOR

DOUBLE BALL BEARING.

SPRING BALL CONNECTIONS. NO EXPERIMENT, A TRIED OUT DEVICE.

THE IDEAL OUTFIT FOR DOUBLE IGNITION. 2, 3, 4, 6 CYL.

SEE OUR NEW BALL BEARING
**ROLLER TIMER**
AT THE SHOWS

SEE US AT THE SHOWS

THE LARGEST STOCK OF ASBESTOS-COPPER GASKETS IN AMERICA. 1200 SIZES.

**HERZ & CO.** CIVIL ENGINEERS

203 LAFAYETTE ST.
NEW YORK

WRITE FOR OUR "IGNITION BOOK"—FREE.

## TRADE PRINTED MATTER

A great deal of useful information for gasoline engine users is contained in a 90-page book recently issued by Janney, Steinmetz & Co., of Philadelphia. It is entitled "How to Run and Install Gasoline Engines," and its object is to instruct the beginner. To those who work on the subject, this book is especially useful. It is copiously illustrated.

The Yale & Towne Mfg. Co., 9 Murray Street, New York City, have just issued a new catalog describing the hand and electric chain hoists, trolleys and trolley tracks for industrial establishments. It is a more elaborate and more ambitious publication than any of their previous catalogs containing 70 pages in an attractive red cover with very appropriate cover design.

"Big Tires, Little Bills," is the subject of a folder recently sent out by Hartford Rubber Works Co., Hartford, Conn., setting forth the advantages of the use of tires large enough to carry the weight put upon them. The illustrations are striking and the general style of the folder is impressive.

A very handsome catalog of 64 pages and cover was recently issued by Termaat & Monahan Co., of River Street, Oshkosh, Wis. Artistically planned, well printed and attractively compiled it is bound to make a very good impression on the recipient relative to the constructional feature of "T & M" two and four cycle gasoline engines. A large number of illustrations are used, both half tones and line cuts and every detail of design is thus clearly shown to the reader.

Several very attractive pieces of advertising matter have lately been issued by G. H. Curtiss Mfg. Co., of Hammondsport, N. Y. relating to Curtiss motor cycles and their achievements. One leaflet entitled "Achievements" contains a list of recent and ancient Curtiss victories. Another tells of "Medal Winners." A catalog describes in detail the construction of Curtiss motor cycle and air ship motors and another explains the features of the complete motor cycle.

Columbus Buggy Co., Columbus, Ohio, have published in brochure form an interesting story entitled "A Race For a Bride" in which a "Firestone" Motor Buggy carries a loving couple to victory and the parson's where the "knot" was tied. An attractive feature of the brochure is the clever and appropriate illustrations, many of which were posed especially for this purpose.

Gleason-Peters Air Pump Co., 255-261 Classon ave., Brooklyn, N. Y., have just issued a new general catalog (No. 50) of G. P. pumps which shows that they have dropped several styles and added others in their endeavor to keep their line fully abreast of the times. Patrons can find in this catalog outfits suitable for practically any purpose requiring compressed air. Their 1909 marine catalog (No. 51) is also ready for distribution.

Very elaborate catalogs have been issued by Peerless Motor Car Co., of Cleveland, describing their 1909 line. A separate catalog is devoted to closed cars. It contains 20 large pages printed in black on a tinted back ground. As a frontispiece photographic illustration of Bunker Hill Monument, Boston, and a street leading to it, is used. The catalog proper is a very elegant publication in which the Peerless cars are shown in natural settings—not forced into unnatural prominence—in the decorative headings of various chapters. The finest half tone engravings are used to illustrate the various models and the main parts. The book is bound in a heavy double cover of pebbled stock with embossed design on the front cover.

Ajax-Grieb Rubber Co., Trenton, N. J., have sent out to the trade a handsome hanger containing a lithographed picture of another "Ajax" girl—the best of the whole family.

The New Departure Mfg. Company, of Bristol, Conn., manufacturers of the New Departure ball bearing which is attracting wide attention in the trade, have issued their first catalogue. It is a handsome piece of work, showing the very best in typographical and engravers' art. The catalogue is very explicit in describing the bearing in all of its points and illustrating fully its adaptability to all places in an automobile where bearings are used. The book is more than a catalogue;—in many ways, it is a treatise on ball bearings, particularly on the new principles developed in the New Departure ball bearing. Automobile manufacturers, engineers, and all who are interested in ball bearings will find this catalogue valuable to them. A copy will be mailed upon application to the New Departure Co.

1909 Columbus Electric cars, made by Columbus Buggy Co., of Columbus, Ohio, are concisely described and effectively illustrated in a handsome catalogue just issued. Accompanying the catalog is a tasteful little booklet bearing the title "The Social Favorite" embossed in gold on the delicate blue cover. The main contents of this elegant little booklet are presents in story form which is followed by specifications and illustrations of Columbus Electrics.

### Book Review

A story entitled "The Girl and the Motor," by Hilda Ward, has been published by Gas Engine Publishing Co., of Cincinnati, Ohio. The book contains 120 pages bound in cloth and lists at $1. The style of this book is that of a gift edition, being printed on heavy book paper with wide margins, a very pretty type face and the binding is a bright red cloth having a special typical cover design. The five page illustrations are from paintings by the author and add to the grace of the book. The book is without the plot of a novel, but has a bit of romance, a snatch of the beautiful scenery of Long Island and a taste of the feminine that delights the mind and frequently provokes a laugh by the mirthful situations that occur.

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## WEED STILL AFTER INFRINGERS

In our Fires, Failures and Judgments Column, on page 66 of the December "Journal," we published a notice relative to the infringement suit brought by the Weed Chain Tire Grip Co., of New York, and the Parsons Non-Skid Tire Co., of London, against the Victor Tire Chain Co., of Nashua, New Hampshire, and in that note erroneously stated that the suit had been adjudicated and verdict found for defendant, by Judge Hale, of the United States Circuit Court at Portsmouth. In justice to the plaintiff, who has called our attention to this error, we desire to publicly announce the facts as they have been now presented to us. In bringing this infringement suit the plaintiff applied for a temporary injunction to secure immediate relief pending the final hearing and this motion was denied solely because, as stated by Judge Hale, it is not the practice of that circuit court to grant preliminary injunctions.

This does not affect the merits of the infringement suit nor the position of the defendants in the case, nor has the purpose of the plaintiff been at all influenced by this action of the court in regard to pushing this infringement suit. The trial will be had at an early date.

# DON'T BUY MAGNETOS

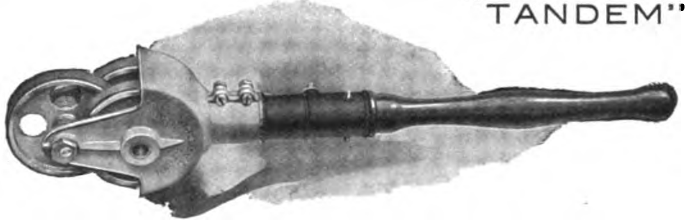
UNTIL

YOU SEE THE HERZ MAGNETO AT THE SHOWS

A REVOLUTION AND—A REVELATION.

TEN YEARS AHEAD
IN
PUMP CONSTRUCTION

## HERZ'S PATENT HAND LEVER FRICTION PUMP "TANDEM"



NEW
IMPROVED
PATTERN

PRICE
$20

TO SEE IT MEANS TO BUY IT. AN ABSOLUTELY RELIABLE POWER-PUMP KEPT IN YOUR TOOLBOX. PISTON RINGS MADE TO LAST. DRIVEN BY FRICTION FROM THE FLYWHEEL OR ANY OTHER PART OF CAR. PUMPS UP THE LARGEST TIRE IN FROM 3 TO 5 MINUTES.

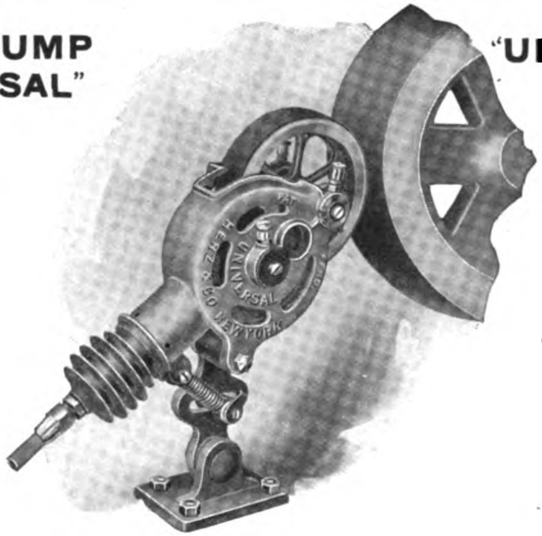
## POWER PUMP "UNIVERSAL"

A FRICTION DRIVEN POWER PUMP.

GEARED DOWN.

SOLE LEATHER COVERED FRICTION WHEEL.

AUTOMATIC INLET, BALL DELIVERY VALVE.



## "UNIVERSAL"

PISTON RINGS NO LEATHER.

PUMPS UP TIRES

PUMPS UP TANKS ON POWER BOATS

**PRICE, $20**

WITH BRACKETS.

## HERZ TIMER 12 TYPES

BOUGIE MERCEDES
HERZ DISTRIBUTOR
B B. PUMP
TANDEM PUMP
UNIVERSAL PUMP
PATERNOSTER SHOCK ABSORBER
PHENIX GASOLINE SAVER

## HERZ MAGNETO

ASBESTOS COPPER GASKETS
CABLES AND WIRES
DETACHABLE TERMINALS, 4 SIZES
WIRE TERMINALS WITH GROOVE
PUCK SWITCH
FOOT LEVER SWITCH
HERZ'S PATENT TIMING ROD

# HERZ & CO.

CIVIL
ENGINEERS

203 LAFAYETTE ST.
NEW YORK

WRITE FOR OUR "IGNITION BOOK"—FREE.

## TRADE CHANGES, DISSOLUTIONS, ETC.

The firm of Allen & Asten, of Port Chester, N. Y., has been changed, Mr. Allen buying out Mr. Asten's interest in the automobile business. Mr. Allen has taken his brother, Henry Allen, in as partner.

The Bosch Magneto Co. announces its removal to its new building at 223-25 West 46th street.

I. J. D. Fairhurst has recently moved his factory from Janesville to Juda, Wis.

Fickling & Co., of New York City, manufacturers of automobile bodies, have leased the seven story building at 304 and 306 West 49th street. They will move their business to the larger quarters as soon as alterations are complete.

The motor car firm of French & Hoffer, Broad street, Pittsburg, Pa., has been dissolved. The business has been taken over by J. A. French, who will conduct it under the name of the J. A. French Auto Repair Co.

The name of the Gate City Motor Car Co., of Keokuk, Iowa, has been changed to the Ayre Manufacturing Co.

The Genessee Garage Company, of Syracuse, N. Y., has made application for authority to change its name to the Genessee Motor Car Co.

The R. E. Hardy Co., of New York City, has leased of the Bush Terminal Co. space in one of their large steel and concrete buildings, located at 37th street and New York Harbor, Brooklyn. The address for the office and factory is now 201 37th street, Brooklyn, New York City. The New York (Manhattan) office continues at 25 West 42nd street.

The Hawkins & Barnett Machine Co., of Trinidad, Colo., has sold that part of its business including motor cars, bicycles and novelty business to the Trinidad Novelty Works.

The Lambert Automobile Co., Baltimore agency for the Maxwell car, has moved its headquarters from Roland Park to Chase street, near Charles street.

The Lockwood Brothers, of Jackson, Mich., have sold their garage business to B. M. Burn, formerly with the Buick Motor Co.

W. E. Mallory has sold his interest in the Kansas Auto and Supply Co., of 526 Quincy street, Topeka, Kansas, to A. C. Longren and C. J. Carlson, both of Topeka. In the future the concern will be known as the Kansas Motor Car Co., and will do a general garage and repair business, in addition to handling several makes of cars.

The New York agency of the Overland Automobile Co. has moved its quarters to 1657 Broadway. A Brooklyn agency has been opened at 305 Livingston street.

The S. H. Peterson Automobile Co., formerly of 2253 Cottage Grove ave, Chicago, has recently moved to 1229 Michigan ave., where it will represent the Waverly Electric and the Gyroscope lines.

The Pittsburg Auto Top company has consolidated with Urling & Co. The new firm is known as Urling & Co. and has the agency for the Corbin cars. It is located at 6112 Broad street, East End. Though the new firm is planning to carry on an extensive business in the sale of these cars, its specialty will be the manufacture of auto tops and wind shields.

The Roberts Motor Co. has recently moved from Clyde to Sandusky, Ohio.

Mr. F. O. Sawyer, 3910 Olive St., St. Louis, one of the oldest tire men of that city has disposed of his entire business to the Firestone Tire & Rubber Co. and will devote his attention to outside interests. This new Branch has been placed in charge of Mr. John P. Trader and will be pneumatic tire distributing headquarters for Missouri, Oklahoma, Arkansas, Indian Territory, Kansas and Texas.

C. S. Schroeder has closed his garage in Wilkinsburg, Pa., and is now located in Oakmont.

The Sultan Motor Co. has moved its New York office to new and larger quarters at 249-51 West 64th street.

The Wilkinsburg Machine & Mfg. Co., of Pittsburg, Pa., has been purchased by C. W. Nichols and R. J. White, of 1012 Wood street. Besides doing a general repair business they will also carry a full line of motor car supplies.

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## FIRES, JUDGMENTS AND FAILURES

The Allenhurst Garage, on Main street, Allenhurst, N. J., was recently damaged by a fire to the extent of $5000. About $2000 was covered by insurance on the building.

The garage of S. A. Teel and Edward Werkheiser, on First street, Bangor, Pa., was destroyed by fire recently. The loss was $25,000, with little insurance.

John Benders' motorcycle and repair shop at 1346 Wood street, Philadelphia, Pa., was almost totally destroyed, and Benders narrowly escaped with his life, in a fire, caused by a gasoline explosion in the place recently. The loss was about $2500 and no insurance carried.

Fire in the three-story building at 106 South Third street, St. Joseph, Mo., occupied by the Frank P. Lee Cycle Co. entailed damages of about $15,000.

The Plymouth Motor Truck Co., of Plymouth, Ohio, has recently been placed in the receiver's hands on application of the J. F. Fate Co., of Plymouth. A M. Trago has been appointed receiver and has been placed under $10,000 bond.

An explosion of gasoline in a garage conducted by W. S. Stern, at 1805 Spring street, Philadelphia, set fire to the place and damaged the lower floor and walls of the building to the extent of several hundred dollars and painfully burned two men.

In the case of Henry R. Carpenter vs. L. N. Southworth, trustee of the defunct Remington Automobile and Motor Company, a decision was handed down in the U. S. Circuit Court of Appeals, at Utica, N. Y. to the effect that the Ilion stock holders of the defunct concern must pay up the unpaid balance on their stock subscriptions. The assessment amounts to about $75 a share.

A petition in bankruptcy has been filed against the Sterling Motor Company, of Binghamton. Claims aggregate $1,314.63. The Firestone Tire and Rubber Co., the Prest-O-Lite Co. and the Syracuse Rubber Co. are the petitioners.

The St. Anne Kerosene Motor Co., of St. Anne, Illinois, has been declared bankrupt.

A petition in bankruptcy has been filed against Max Wineburgh, doing business as the American Automart, No. 1621 Broadway, New York City, dealer in automobile supplies and garage, by Hays Rubber Co., $525; Figman & Freirich, $136; American Lamp Works, $94. Liabilities are estimated at $10,000.

The Commercial Motor Vehicle Co., of Indianapolis, Ind., has been petitioned into bankruptcy by Wm. H. Thomas, secretary of the company, alleging that the company owes him $250 borrowed money and $1650 put in when the company was incorporated.

Fire on October 9th destroyed 11 automobiles and all machinery in the Livingston automobile garage, owned by Bennett and Hornbeck, in C. S. Hefferlin's new building, Livingston, Mont., built especially for them this spring. The total loss exclusive of insurance, is $30,000. The insurance on the building amounted to $1000 and on automobiles $7500.

The garage of David Young, Muncie, Ind., was recently completely destroyed by fire. The loss is about $8,000, half the amount being covered by insurance.

A faulty electrical connection on the charging board of the Weed Garage, 232-234 Ontario street, Toledo, Ohio, started a fire which caused damage to the amount of $200.

# News Notes

It is now pretty well settled that there will be a touring contest for the Glidden trophy held by the American Automobile Association next year and that it will be run through the west. It may go from New York to Denver and end there, or it may start from Chicago, go to St. Paul, Omaha and Denver and finish at Chicago, but one of these two routes probably will be used.

The Chalmers-Detroit "30" car, which travelled 208 miles a day for 100 consecutive days between August 9, and November 17, a total distance of 20,800 miles, has been shipped from the factory at Detroit to Carl H. Page & Co., Chalmers-Detroit dealers in New York City, where it will be used for demonstrating purposes. Afterward, it will be sent to Philadelphia, Boston and other eastern cities. The car will be on exhibit at the New York and Chicago shows.

Talk of Madison Square Garden being sold and torn down appears to be somewhat premature and perhaps misleading. Altho it has been advertised as for sale, it would now seem from information gleaned from near headquarters that the agitation has been due to certain manipulative plans of the management. John Pierpont Morgan, the biggest stockholder, has said recently with much explicitness that the Garden will not be torn down.

The Motor Club, of Harrisburg, which conducted very successful reliability contests in 1907 and 1908, announces a four-day reliability run for the first week in May, 1909. As it is generally understood that next year's Glidden tour will start from Chicago and proceed westward, the Harrisburg Club will aim to make its contest the important eastern reliability tour of 1909.

The rules will provide for observers on all cars, and a technical examination at the finish. One of the features will be an actual tire record giving a practical contest for tire manufacturers.

With the signs of prosperity increasing there is every reason to believe that a successful and stimulating series of races could be held on the Florida beach in the spring, if they are held the last of March, as there is now talk of doing. Every year heretofore these contests have been held too early for the manufacturers and, worse still, have been held before the beach has become settled after the winter storms. With the beach in good condition, the shows off the minds of the manufacturers, and proper arrangements made for hotel accommodations, at reasonable rates, a meet of unprecedented proportions could be held under proper management.

The political campaign just closed has been marked by no more enlivening feature than that furnished by the automobile. The "whirlwind" campaign of the chief candidates before the people would have been impossible without this means of rapid transit.

Beginning January 1st, 1909, freight rates to California from the East are to be raised considerably, making an increase of from $25 to $40 each on big cars. From the New England States the rate will be $8 per hundred pounds, and from the Middle States about $7 per hundred, as against the old rate of $6 per hundred.

The traffic department of the N. A. A. M. has again been successful in obtaining concessions of great importance to all members of the N. A. A. M., the A. L. A. M. and the A. M. C. M. At a meeting of the Southern Classification Committee, held at Cincinnati recently, important changes were made in the Southern Classification. Mr. Marvin, manager of the N. A. A. M. traffic department, represents the Associations named above.

Colonel George Studebaker, of South Bend, Indiana, has suggested a "non-repair" competition, as an adjunct of the established Glidden Tour. He offers to put up an artistic trophy valued at $5,000, and to be known as the Studebaker Gold Cup, to be contested for by any or all entrants to the Glidden Tour, making no special conditions for either roadsters or touring cars—no price or power restrictions.

The Brush Runabout Company's transcontinental car, which was reported in a recent issue as at that time passing thru the great American desert of lower Nevada, reached San Francisco on November 11th. The driver of this car reports the roads in lower Wyoming and Northern Utah as almost impassable at this season of the year. The car made the trip from Detroit to San Francisco at an upkeep expense of $4.95.

David Fergusson, mechanical engineer of the George N. Pierce Company, has just returned from abroad, where he visited the principal automobile factories of England and France and inspected the new models of the leading German and Italian makes.

As a result of his observations Mr. Fergusson says that two tendencies in construction stand out prominently above all others. The first is the wide adoption of the shaft drive among makers who have, heretofore, produced none but chain driven cars, and the other is the abandonment of ball bearings for crankshafts in favor of plain bearings.

# The Schaap Flame

A revolution in the metallurgic world. A flame produced from illuminating gas and atmospheric air so variable chemically and thermally that impossibilities become mere child's play. We localize fusing heat on any weight or kind of metal. Therefore we have

## Safety, Economy and Efficiency

**THE BASIC ESSENTIALS OF ANY PRACTICAL SYSTEM**

### It Will

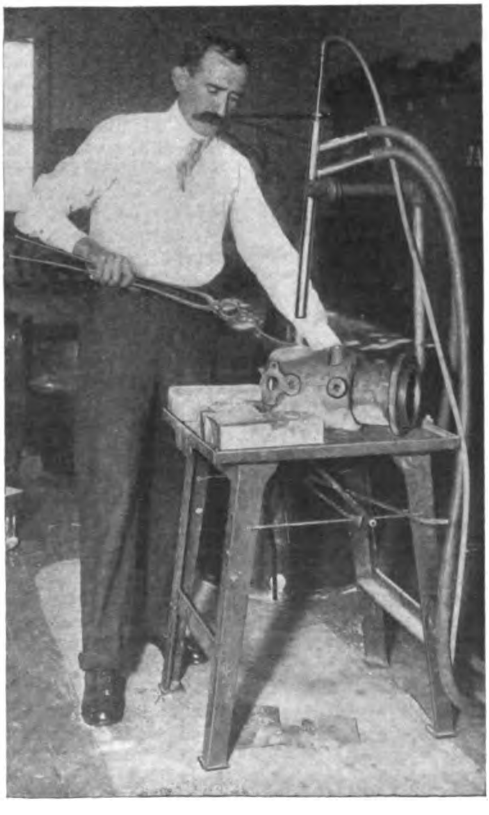
Weld cast iron to steel.

Steel to bronze.

Aluminum to bronze.

It will weld any material whatsoever from which castings are made, leaving the materials tougher, stronger and more refined

## Without the Aid of a Flux



**Welding a Cracked Cylinder**

### It Will

weld cast iron cylinders without their becoming warped or distorted, and with positive improvement in the quality of the materials. We can melt down iron and steel on an open brick and flow them like water. We duplicate the blacksmith's forge in a flame the size of a match at a working price so small it is positively insignificant. We can weld a water jacket without dismounting or taking the engine down. We can babbit a bearing similarly.

☞ The burners are the simplest and easiest to manipulate in the world, as when in operation the outside of the burner is cold clear to the tip end, while the heat one inch from it is hot enough to fuse grey iron in half a minute.

**Don't Forget** We use nothing but illuminating gas and atmospheric air—no dangerous and explosive gases, such as acetylene, oxygen, etc.,— hence we have absolute safety and great economy.

## Schaap Flame Utilities Corporation

**Installation of autogenous welding and fusing plants under the Schaap Patents**

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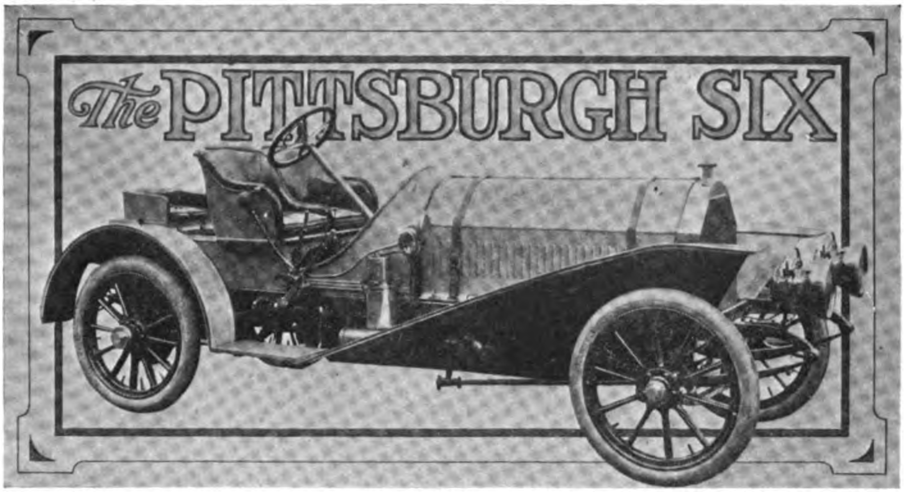

The 1909 Pittsburg Six cars, made by the Fort Pitt Motor Manufacturing Co., New Kensington, Pa., while following the general lines of the 1908 models, show some radical changes and refinements in detail which insure a place in the front rank of strictly high grade American-built cars.

The principle of design followed was to make a car with a simple, powerful and efficient power plant and transmission, giving at the same time all the requirements and controls necessary to a car that can be easily handled under all conditions.

The principal changes in the 1909 models are the use of the Hele-Shaw multiple disc clutch in place of the cone clutch formerly used, changed timing of motors, the use of Vanadium steel axles, a new six-cylinder inlet manifold, and general improvements in the fine points of the car throughout its details.

Three models are placed upon the market this year: A three-passenger disappearing-seat roadster completely equipped, except top, for $2,800. A four-passenger (individual seats) roadster at $3,000, and a seven-passenger touring car completely equipped, less top, price $3,250. All of these models have the same general chassis with the exception of the touring car, in which some frame changes are made to accommodate the large body. The motors are 6-cylinder, rated at 70 H. P.

### MOTOR DETAILS.

The 6-cylinder motor, Fig. 1, has cylinders cast separately with integral water jackets and valve pockets, bore 4¾ in., stroke 5¼ in. Cylinders are a high grade gray iron, bored and ground exactly to size. Crank shaft is of the seven-bearing type, plain white-bronze bearings of large size being used throughout. Crank shaft, chrome-nickel steel, finished all over, hardened and ground to exact size. The inlet and exhaust manifolds are located on opposite sides of the cylinders; valves mechanically operated, inlet and exhaust valves interchangeable, valve lifters adjustable. Heads of the valves are all nickel steel, electrically welded to the mild-steel stems. Connecting rods are drop-forged, fitted with plain white bronze bushings, all of large dimensions. Crank case is of aluminum alloy cast in two parts, upper and lower halves, with the lower half forming reservoir for oil for splash lubrication. Separate aluminum castings are used to completely house the gears which are spiral, steel and bronze, running in oil. The engine is carried on a dropped sub-frame from the main pressed steel frame, giving an almost straight line drive. On the motor casing is mounted a Sims-Bosch magneto driven by shaft from secondary gears. On the opposite side of the motor is mounted a water pump of the Vane type and forced feed oil pump, also driven by shaft from the secondary gears. The magneto and pumps are therefore very accessible. Oil is maintained at a constant level in the crank case, an auxiliary oil tank being provided to keep up the level in the crank case and an auxiliary hand pump is provided for emergency.

A sight feed for determining the oil flow is mounted on the dash. The secondary shafts on opposite sides of the motor are enclosed in the crank case and oiled by splash lubrication. Four wide rings are fitted to each piston—pistons accurately ground and properly tapered.

Copper water pipes are used with ground union connections to cylinders; slip joints for expansion are provided. The exhaust pipe is a large cast iron manifold, tapering from the first cylinder to the muffler pipe, and so designed as to lead the exhaust gases away from the cylinders without interference, being provided with a separate lead from each cylinder to the main pipe. This pipe for 1909 will be made of steel tubing autogenously welded, making a very light and strong construction. The timer for the battery system of ignition is mounted on a vertical shaft, and driven through bevel gears from the secondary shaft. The crank shaft is flanged for bolting on the fly-wheel. The engine may ordinarily be started on the battery without cranking, or on the magneto by cranking. The muffler is of the multiple unit pattern, and is remarkably efficient.

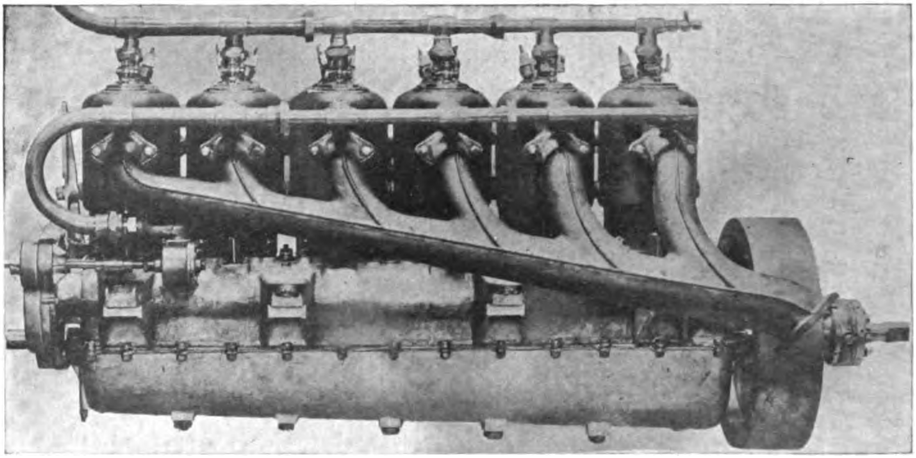

Fig. 1. Six-cylinder motor of the 1909 Pittsburg Six, showing exhaust side, cylinders cast separately; 4¾-inch bore and 5¼-inch stroke; 70 H. P., seven crank shaft bearings of white bronze; valves on opposite sides; spiral halftime gears; dual ignition. Note the design of the exhaust manifold arranged with increasing diameter.

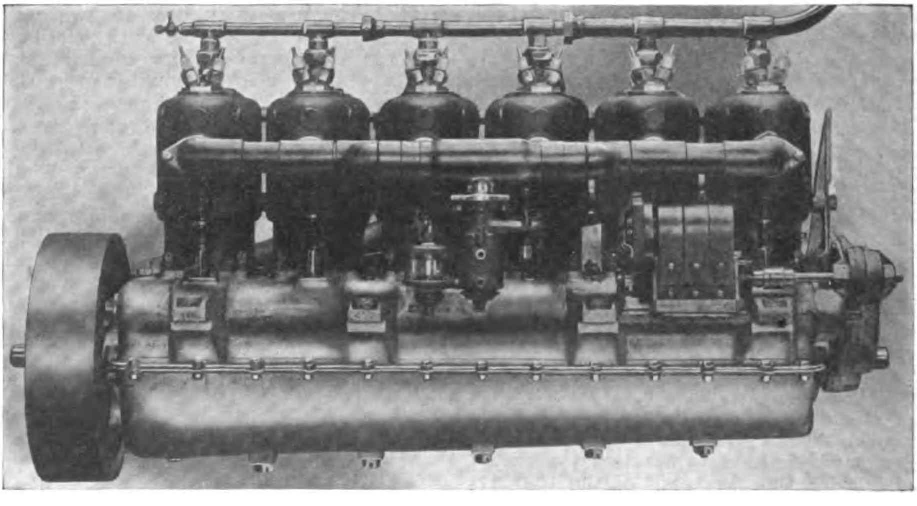

Fig. 2. Intake side Pittsburg Six motor, showing mounting of the magneto, location of the carburetor and the supporting arms of the crank case. Note the two spark plugs in each cylinder head. The inlet pipe shown has given place to a new design recently gotten out by this company and illustrated elsewhere in this article.

### IGNITION.

A double system of ignition by jump spark is furnished. Sims-Bosch, Unterberg & Helme and Splitdorf high-tension magnetos are furnished at the option of the purchaser. An independent coil and storage battery system is furnished for starting, although the motor may be started successfully on the magneto under ordinary conditions. The two ignition systems are separate, two plugs being in the cap directly over each inlet valve. The wiring is of the best grade and encased.

### A NEW SIX-CYLINDER INLET PIPE.

A new inlet manifold for 6-cylinder motors has been designed to give a uniform supply of mixture to all cylinders and is connected to an automatic sight flow feed carburetor. This pipe, which is of very simple design, gives exactly equal lengths of pipe from the carburetor to all six cylinders,—and the same path for the gas through the pipe for all cylinders of the motor,—regardless of the position of the cylinder. The usual flange connections to the cylinders are connected by a continuous long pipe to all cylinders as shown by the accompanying line drawing. At the first and sixth cylinders this continuous pipe is joined at the ends by return bends to a long pipe parallel to the cylinder connections. At the centre of the long pipe the carburetor connection is placed. This gives a looped piping in which the carburetor connection is included, which passes the six cylinders. The action of the pipe is explained as follows by the makers: The gas in leaving the carburetor travels in both directions along the auxiliary pipe to the cylinder requiring gas at any particular instant, i. e., the gas must travel the full length of the inlet pipe to reach any one cylinder, and this means that the gas travels the same distance as well as equal distance for all cylinders. As compared with the best known theoretically correct pipe heretofore used, the complete looped pipe described above is actually shorter in its total length. And while a long pipe is of necessity required for a 6-cylinder motor, it has been found that the extra length of pipe gives a reserve supply of gas and apparently allows much more rapid changes of motor speed.

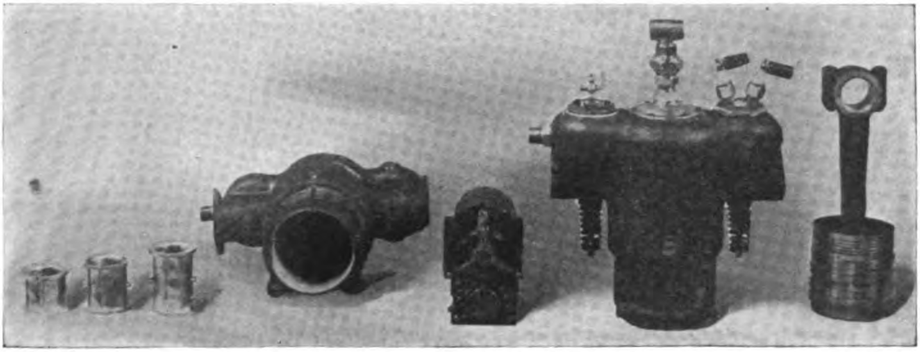

Fig. 3. View of the cylinder, piston, connecting rod, magneto, and some of the white brass bearings of the Pittsburg Six.

Motor tests show surprising results. The company claims that on block tests the motor will run smoothly at lower speeds and at higher speeds than with any inlet manifold of types hitherto used for 6-cylinder motors; and better control is secured in rapid changes in motor speed,—all with lower gasoline consumption per mile than secured with manifolds previously used. On block tests 300 R. P. M. higher speed than before obtained was secured, and on the road from 4 to 5 miles an hour was added to the best previous speed. The new inlet pipe as described is not shown on cuts of the motor illustrated in this article.

### GASOLINE FEED.

The Mercedes pressure system—pressure maintained in gasoline tank at three lbs. by exhaust pressure through regulating valve, while the engine is running—is used and a hand pump provided for emergency and starting pressure. This system gives a closed gasoline tank, under very slight pressure—automatically maintained while running, allowing the tank to be placed low in the rear of the chassis, and giving unvarying flow of gasoline to the carburetor, regardless of whether the car is going up or down hill, or on the level—the gasoline feed does not change. The gasoline tank is of 20 gallons capacity.

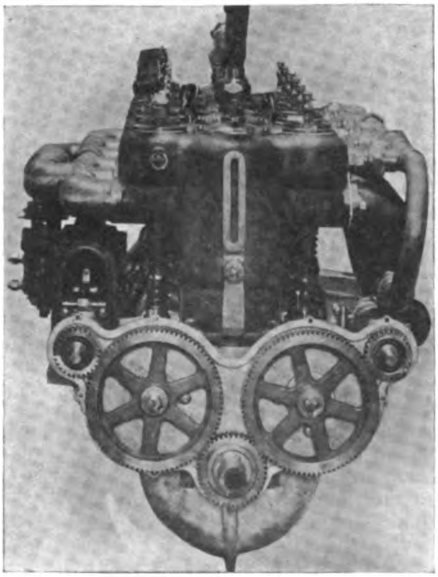

Fig. 4. Front end of Pittsburg Six motor, showing arrangement of the magneto and pump driven by spiral gears at the forward end of the engine.

### RADIATOR.

A new honeycomb style radiator is used, of ample capacity to take care of low gear and second gear work, although the car is regularly driven almost regardless of road conditions on high gear, the speeds varying according to the makers from 5 to 75 miles per hour. A fan is driven by an adjustable wide belt to assist the radiator action.

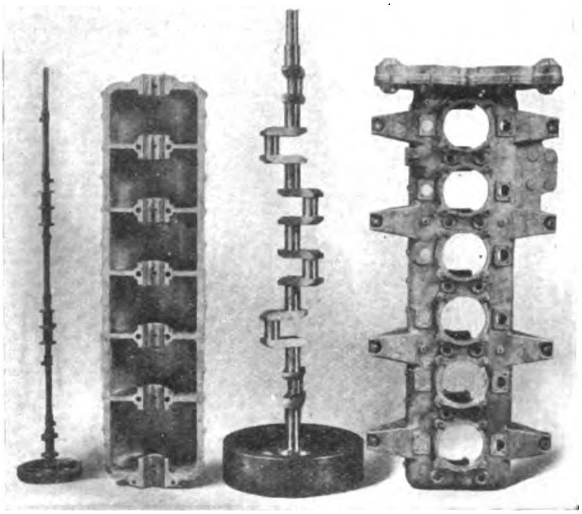

Fig. 5. View of the top and bottom of the Pittsburg Six crank case and the Krupp chrome nickel steel crank and cam shafts.

CONTROL AND STEERING GEAR.

The steering gear of the worm gear type is mounted on the sub-frame and is provided with ball bearings throughout, adjustable for wear. An 18-in. hand wheel is regularly furnished. Spark and throttle levers on steering wheel. Pedal clutch control, with foot brake levers and hand emergency brake levers are provided.

CLUTCH.

The Hele-Shaw multiple disc clutch of special design for the Pittsburg Six cars is used. Little more need be said of this clutch, which is a metal to metal proposition (hardened steel against bronze) running in oil, which makes it practically as proof against wear as the main bearings of the motor. The metal surfaces running in oil means that there is no clutch leather to burn out or harden, or to fail because of oil, or to be replaced through wear. In other words, the clutch stays in condition. Very easy adjustment is provided by means of one adjustment on the central spring, the single spring type of Hele-Shaw clutch being used. Gradual engagement is assured and the car can be easily and smoothly started on the second gear and can even be satisfactorily started on high gear, but does not slip when driving on any gear, at any engine speed. This clutch makes the car one of the smoothest to handle that could be desired and was adopted after other clutches had been thoroughly tried out.

THE CHANGE GEAR.

A sliding gear, selective type, three speeds forward and one reverse, with direct drive on third speed, is employed. Hardened chrome nickel steel and D. W. F. annular ball bearings are used. Warner Gear Co. selective change gear levers are mounted on the side frame member. A large inspection plate is fitted on top of the gear case and the case is tight and filled with lubricant. A sheet metal apron is provided to protect the motor and transmission.

REAR AXLE AND DRIVE.

Drive to the live rear axle is by a nickel-steel shaft with universal joints at both ends of the shaft, enclosed by a pressed steel housing and packed in grease. Live rear axle with bevel gear drive has always been used on the Pittsburg Six cars, and it has therefore not been necessary this year to change from a chain drive to the bevel gear. The rear axle ratio is 2⅝ to 1. Thirty-four-inch wheels are used this year instead of 36 in. as previously. The wheel base is 124 inches. Ten-inch road clearance is secured.

FRONT AXLE.

The front axle is of the I-section type. made from a one-piece drop forging, of Krupp steel. Large annular ball bearings are used on both front and rear axles. The steering connections are placed in the rear of the front axle.

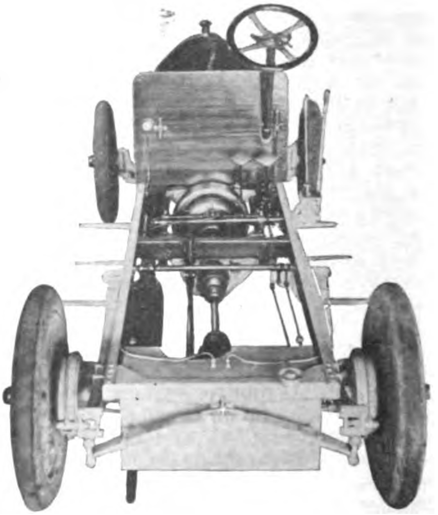

Fig. 6. Rear view of the Pittsburg Six, 1909 model touring car chassis, showing the large platform springs, the strongly reinforced pressed steel frame and the large gasoline tank in the rear using exhaust pressure feed. 24-inch wheels are used and the wheel base is 124 inches.

BRAKES.

Four brakes in addition to the motor are provided in two independent sets. Two internal expanding shoes on the rear hub drums, applied by pedal, and two external contracting band emergency brakes on the rear hub drums are applied by side hand lever. The clutch and brakes are not connected, on the grounds that the engine and both sets of brakes may be used at the same time if necessary; in other words, three sets of brakes may be used, without interference, by not connecting the brake levers and clutch in any way. Large surfaces are provided on the brake drums, which are 12½ in. in diameter and 2½ in. width. The brakes are metal to metal and either set of brakes has been proved ample to stop the car in a short space, or to hold it on the steepest incline yet encountered.

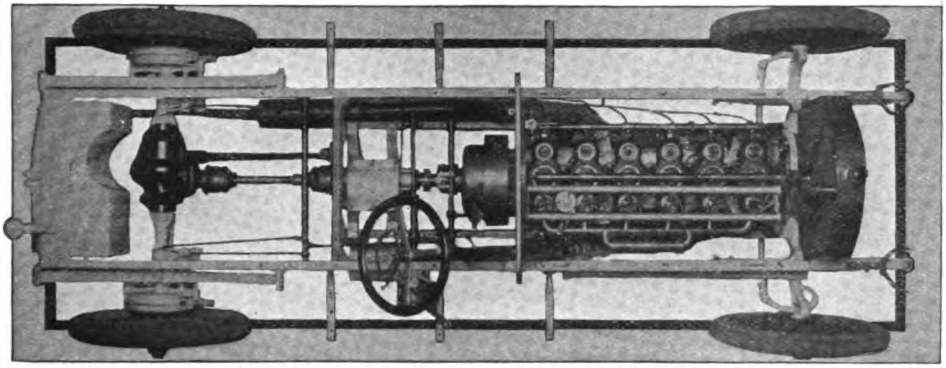

Fig. 7. Plan view of the Pittsburg Six 1909 chassis. This view clearly illustrates the arrangement of the various members and their location in the frame.

SPRINGS.

Spring suspension is by semi-elliptic springs in front, while in the rear a platform three-point suspension is used on all models, giving a remarkably easy-riding car. All springs are 2 in. wide, front 42 in. long, rear (side) 44 in. long, (cross) 36 in. long.

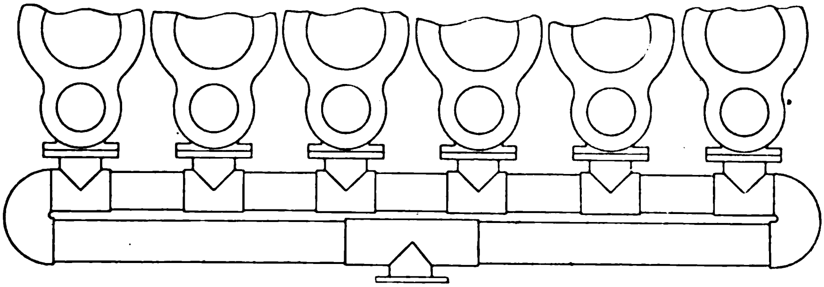

Fig. 8. The new Pittsburg Six intake manifold, for which great results are claimed by the makers. It is intended that the gas for each cylinder shall be drawn from the carburetor, part of it following the loop in one direction and part in the other, thus causing the gas to travel the entire length of the pipe. This it is claimed is what happens for each cylinder, thereby giving an equal length of travel for the gas to each cylinder and therefore equal distribution.

Both the frame and engine sub-frame are of channel section pressed steel, amply reinforced by large gusset plates.

BODY.

The bodies for the three models are made to the special order of the Fort Pitt Company from the very best selected woods obtainable, are specially reinforced and are upholstered and painted in the shops of the Fort Pitt Company.

The general design of the bodies follows the straight line principle. Model B roadster has individual front seats and disappearing rumble seat. Model C four-passenger tourabout has individual front seats and individual rear seats, while the Model D touring car has a seven-passenger body with two substantial revolving and folding extra seats which may be folded out of the way against the side of the car or entirely removed in a moment, and at the same time are substantial and comfortable additional seats. An unusually neat design for these extra seats to make the car carry seven passengers has been worked out by the manufacturers of this car. The hood or bonnet is of steel of the three-hinge type. The regular colors furnished are French gray and maroon running gears for the roadsters, blue body and light running gears standard for the touring cars. Black or red leather trimmings are used and special colors are furnished to order.

The Fort Pitt Company builds all the motors and various small parts for the cars in its shops at New Kensington, Pa., having the iron and aluminum castings made to special design and to its own patterns outside of its own shops. The cylinders, valves and cases are received in the rough and finished in the shops of the company. All brass castings, however, are made in the foundry department, all painting and upholstering is done in the painting and upholstering departments of the factory, and all small parts and fittings are made in the machine shop at the factory. The cars, therefore, are not merely "assembled" cars, but the principal parts (the motors) are made in the factory, and all other parts are built of special material and to special order of the engineering department by some of the best manufacturers of these parts in the country.

**The "Pittsburg Six" is, therefore, not in any sense an "assembled" car, but is manufactured and assembled in the shops of the Fort Pitt Motor Mfg. Co., New Kensington, Pa.**

**On the road in the Pittsburg district the Pittsburg Six has gained an enviable reputation by its performance, regardless of road conditions. The first 1909 stock model entered in the Providence races October 10th, without being stripped and absolutely without any previous try-out, won first place among strictly stock cars in the five-mile free-for-all, and came within two seconds of the winning French racer.**

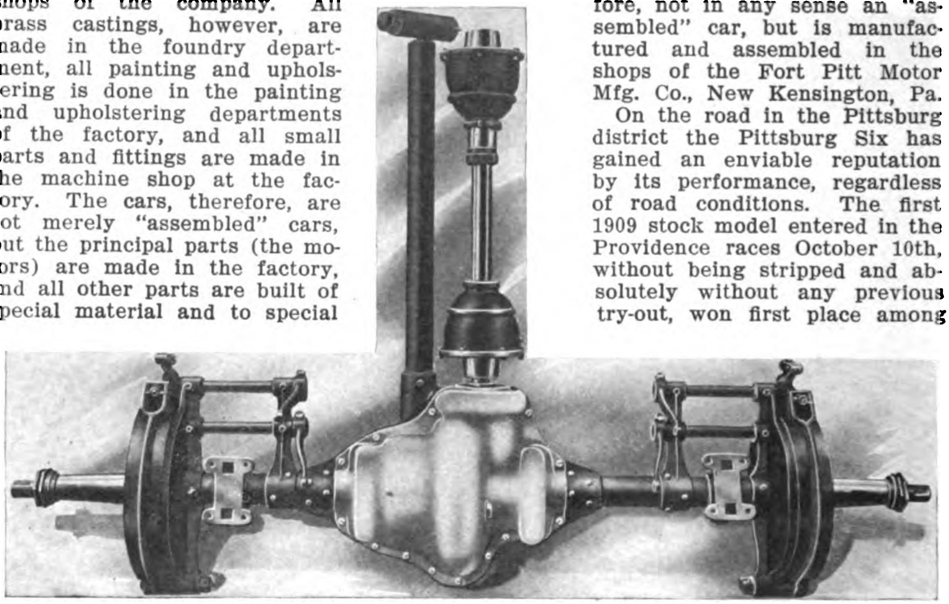

Fig. 9. Driving shaft rear axle and brakes of the Pittsburg Six 1909 model. This rear axle is of the live type and the brakes are in independent sets, internal expanding and external contracting on the same drum. The short shafts with arms at the ends mounted from fixtures on the rear axle housing allow the use of straight pull rods for the brakes. Two encased universal joints running in grease are used and a heavy torsion arm, as shown.

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**Mr. George Holloway, who for the past 16 years has been general superintendent of the Elmore Automobile Co., of Clyde, Ohio, has associated himself with The Vim Motor Mfg. Co., of Sandusky, Ohio. The above company make the well known "Vim" two-cycle marine motor and they purpose manufacturing a two-cycle automobile motor in the near future.**

**Through an enlargement just made of the factory of the H. H. Franklin Manufacturing Company at Syracuse, N. Y., new offices have been provided for the Engineering Department. These provide space double that formerly available and, with large windows along three sides, are better lighted than most drafting rooms among factories in general.**

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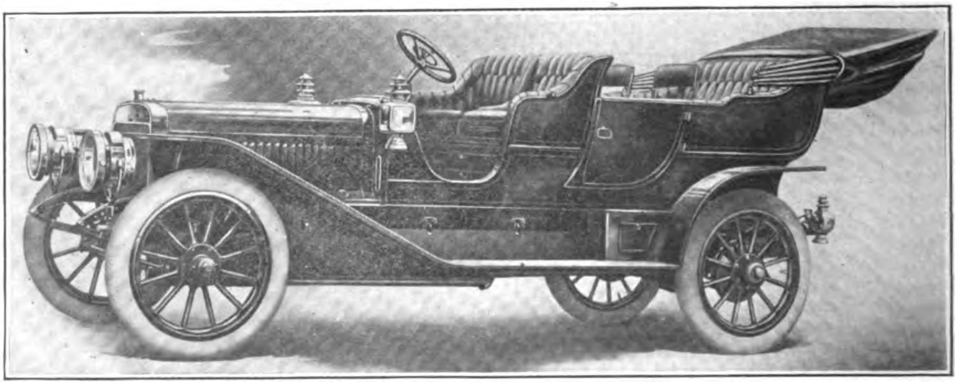

View of the new 60 H. P., 7-passenger Winton. This car is finished both as a runabout or as a seven-passenger touring car, as shown, for $4,500. Also as a Limousine for $5,750, or as a Landaulet for $6,000. It is powered by a 6-cylinder Winton motor, 5 x 5 inches. The regular tire equipment is 4½ in. Goodrich quick detachable front and rear. The wheel base is 130 inches, and the road clearance is 10 inches. Other 1909 models described in the September, 1908, issue, page 85. This car, as other Winton models, has the self-starting feature.

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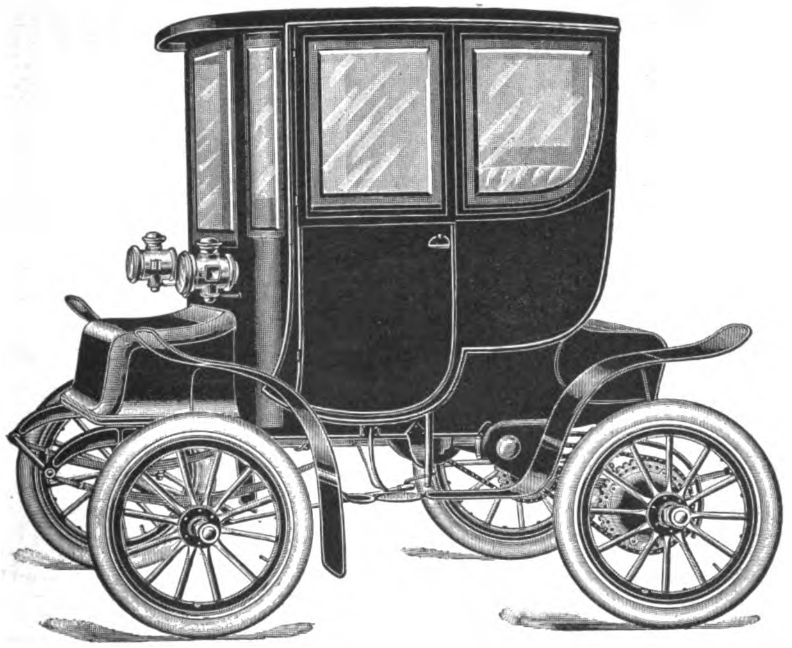

FOUR PASSENGER—ONLY ONE OF SEVEN STYLES

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You have no fear of competition when you represent the wonderful "DETROIT ELECTRIC." Write today about agency.

**The ANDERSON CARRIAGE CO.**
DETROIT, MICHIGAN

# Pennsylvania, Type D "25"

To-day is undoubtedly the day of dependable, medium-priced, high-grade automobiles, as is evidenced by the large number of such machines now making their appearance on the American market. The Pennsylvania, Type D "25" is one of the latest of these good value-for-your-money propositions. It is manufactured by the Pennsylvania Auto Motor Company, Bryn Mawr, Pa., and looks like a leader for 1909. This company will continue to make the Model C, known as the Pennsylvania "50," with a 4¾ x 5½-inch engine, practically the only changes being an increase in length of the rear side springs of 3 inches, and 4-inch instead of 3½-inch tires, the price remaining the same as last year—$3,000. A new Model E on the same chassis as the C, with the exception of the wheel base, is also to be part of the line. This car is a 7-passenger machine with Quimby body, and sells for $3,800. Model E, together with the new F, six-cylinder car, will be described in a later issue of The Journal.

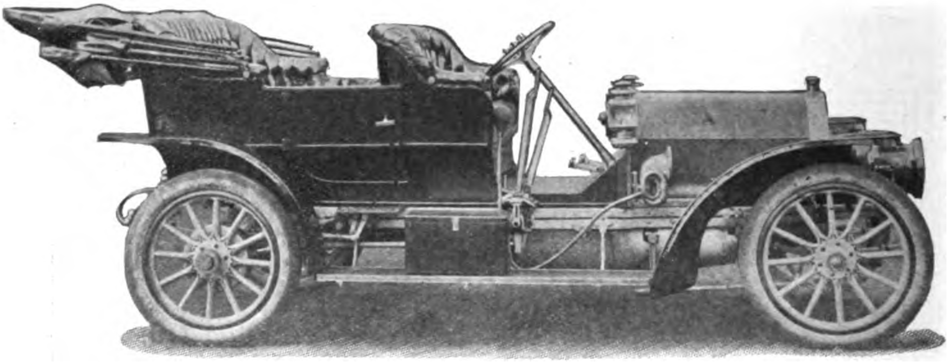

Fig. 1. The Pennsylvania Type D "25" motor, 4¼ x 4¼ inches, 29 H. P., A. L. A. M. rating; 110-inch wheel base; 32 x 4-inch tires front and rear, large for a car of but 2400 pounds weight. The regular body equipment is a runabout for two passengers, flat deck at rear. Price $2000. With the body shown, or with a baby tonneau, $2100.

### TYPE D.

This car might be termed a small edition of the well-known Pennsylvania "50." The motor is of the same general design, although smaller, being 4¼ x 4¼ inches, A. L. A. M. rating 29 H. P. The actual brake test, however, it is claimed, showed 34 H. P. The wheel base is ample, being 110 inches and 32 x 4-inch tires are used on all four wheels, which is extremely liberal for the size and weight of the car, which, with loaded tanks, is 2,400 pounds.

The first feature to strike the observer is the symmetry of the lines of the entire car and its low-hung body. The radiator front is just over the axle centre. The regular body equipment for this new model is for two passengers, a flat, unencumbered deck extending to the rear, but containing a sunken compartment with flush covering and lock, providing handy space for carrying. This compartment is far enough forward so that a special hamper or trunk can easily be placed on the rear without interfering with access to it. With the two-passenger roadster body the car sells for $2,000. A baby tonneau or a touring body can be had for $2,100. As a runabout or with the baby toneau, the steering column is given considerable angle, and racytype guards constitute the regular equipment. The standard color is red with black trimmings, and the equipment consists of two Mangin Mirror front lamps, two oil side lamps, tail lamp and generator, horn, tire outfit, pump, assortment of tools sufficient for road adjustment, robe rail, foot rail and muffler cut-out.

The motor is of the valve-in-the-head type, using two cam shafts, and all bearings are of special die cast babbit of exceptionally large size.

Schebler's latest improved carburetor is used in connection with an accelerator pedal, which of course operates independent of the wheel setting.

### THE OILING SYSTEM.

The oiling system is worthy of special mention. A Kinwood force feed lubricator is placed at the side of the engine and driven by an eccentric on the end of the cam shaft operating a ratchet and pall on the oiler. The oil pressure runs up to 90 pounds per square inch in the leads to the main bearings, the forward bearing is four inches by two inches, the centre 3¾ x 2, and the fly-wheel bearing of the main shaft at the rear end is 5 x 2 inches. The excess oil from the main bearings is caught in small applied, eccentric, aluminum rings, cap screw retained to the crank shaft. From these the oil is thrown by centrifugal force through grooves or oil channels on the inside of the hollow crank shaft and forced out of leads to the surface of the crank pins, some of it finding its way up the channel in the connecting rod to the wrist pin. At the upper end of the connecting rod a pocket is provided to catch and retain this oil. The outboard bearing of the motor also are arranged with annular pockets and a wedge-shaped ring integral with the crank shaft, so that the oil which works into this groove is not allowed to drip or be blown over the outside of the engine. The oiling system is made also to include lubrication for the clutch bearing, the rear end of the crank shaft being hollow, the oil feeds through it and comes outward to the surface through two small holes. As this is simply excess oil from the rear bearing, the quantity is slight, but amply sufficient for lubricating the clutch bearing. No splash lubrication is used whatever, but it is claimed that the oilers are so accurately adjusted before leaving the factory that practically no excess oil is fed to the engine, the supply being just sufficient and equal to the waste.

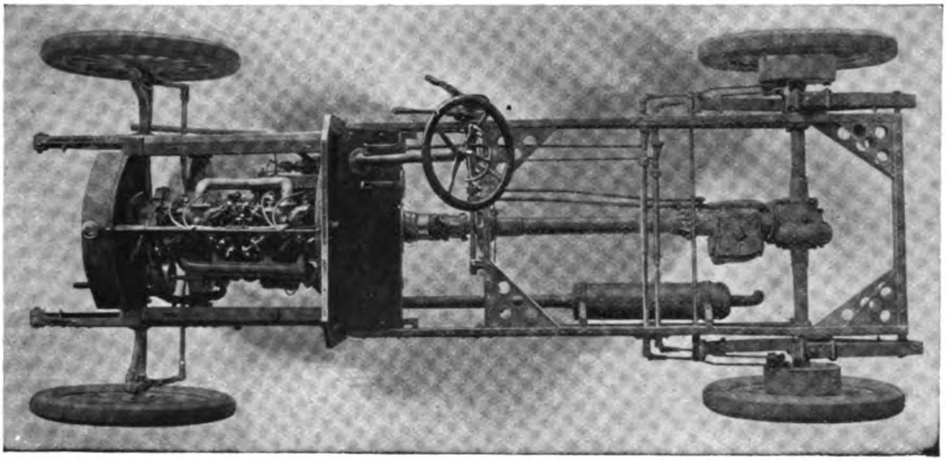

Fig. 2. Plan of the Pennsylvania Type D chassis. Particular attention is called to the neat change speed rear axle, the three-quarter elliptic springs at the rear, the exceptionally well braced pressed steel frame and the large twin brakes.

### DETAILS OF MOTOR.

The gray iron cylinders are cast in pairs and have pilot rims at the lower ends, to insure proper alignment when set into the crank case, and are held by six studs to each pair. These studs pass into tapped holes into internal bosses, giving additional length and strength to the thread cut in the aluminum. Lapping is the method employed for finishing accurate bores in the Auto Motor Company's factory in preference to grinding. The connecting rods are I-section, drop forgings, the lower end, big end bearing, consisting of a nickel babbit bushing, which is set up with shims of copper, each 3-1000 of an inch in thickness. Attention to minute details of construction is shown by the padding together of these shims at the outer edges, somewhat after the fashion of paper scratch pads by means of solder. This prevents any of these light paper-like copper shims from being blown away or lost when the motor is disassembled, but is no hindrance to the separating or removal of a single shim or more, when in course of time it is necessary to take up a bearing, thus providing an accurate adjustment for wear. The wrist pin bearing is a bronze sleeve, a force fit into the upper end of the rod. The wrist pin itself is hollow, hardened steel of 1-inch diameter. Eccentric step-jointed rings, three in number, and all pinned, are fitted to the upper end of the piston, while at its lower end three oil grooves are turned, facilitating the distribution of an oil film on the cylinder walls. The wrist pin is positively retained from side-slipping by the use of a set screw at each end passing through the piston bosses and the wall of the pin, and having a bent wire passed through poles in the inner ends of the set screws. The connecting rod, big end cap, is held by two bolts and castellated nuts. The crank shaft is a high carbon drop forging running in three large nickel babbit diecast bearings, which are supported to the upper half of the aluminum crank case, each by four bolts and castellated nuts.

Quiet running qualities are given by the use of rawhide and metal combination half-time gears. The crank shaft gear is composed of a rawhide centre with metal outsides, while the cam shaft gears are just the reverse, rawhide outside with metal centres, so that in each instance rawhide engages metal, making these Pennsylvania half-time gears noiseless. Split washers are used under cap screw heads where there is no reciprocation of load, but castled nuts are used in all other places.

The cam shafts have hardened, taper pin applied cams. A peculiar construction consists in the use of cast iron bearings for the hardened steel cam shaft, these bearings being retained by external cap screws in position in the aluminum case. The bearing surface of the cam shaft is cut with a helical distributing oil groove, and the entire shaft and its bearings can be removed through the front somewhat larger hole filled by the forward cam shaft sleeve bearing.

A fine thread, twenty to the inch, is used on nearly all of the bolts and studs in the engine construction, particularly on the connecting rod and main bearings, which facilitates accurate adjustment when castled nuts are used. The valves are arranged in cages, the inner ends of which are tapered and ground joints into the cylinder, these cages being retained by large cast iron nuts sunk into the cylinder heads. The valves themselves have cast iron heads mounted on threaded steel stems, the ends of which are riveted over into a counter sink, the heads butted against a shoulder to insure accuracy. Forty-pound tension valve springs of the usual helical form are retained by stamped steel cup washers and horseshoe shaped yokes, or washers open at one side, which set into slots in the valve stems above the stamped steel washers. Overhead rocker arms, drop-forged and bone-hardened, contact directly with hardened steel caps, or tips brazed to the valve stems. The rocker arm standards are malleable iron, cap screw retained to the cylinder heads. These rocker arms in the valve lifting rods are arranged on opposite sides of the engine and operated by the cam shafts. The valve lifting rods are ½-inch, 20-gauge steel tubing with screwed in and brazed ends. The upper end of the rods attach to the outer ends of the rockers by means of drop-forged yokes below which is a check nut, valve lifting rod length adjustment being obtained by screwing the rod up or down on the yoke and locking with the nut. The lower applied end of the rods form an inverted cup which fits directly over the short valve lifting rods which carry hardened steel rollers at their lower ends, which run on the cams. The valve lifting rod guides are very long bronze fittings screwed into the crank case. The rollers are ⅞ inches in diameter and are guided by slots in the lower end of the guides.

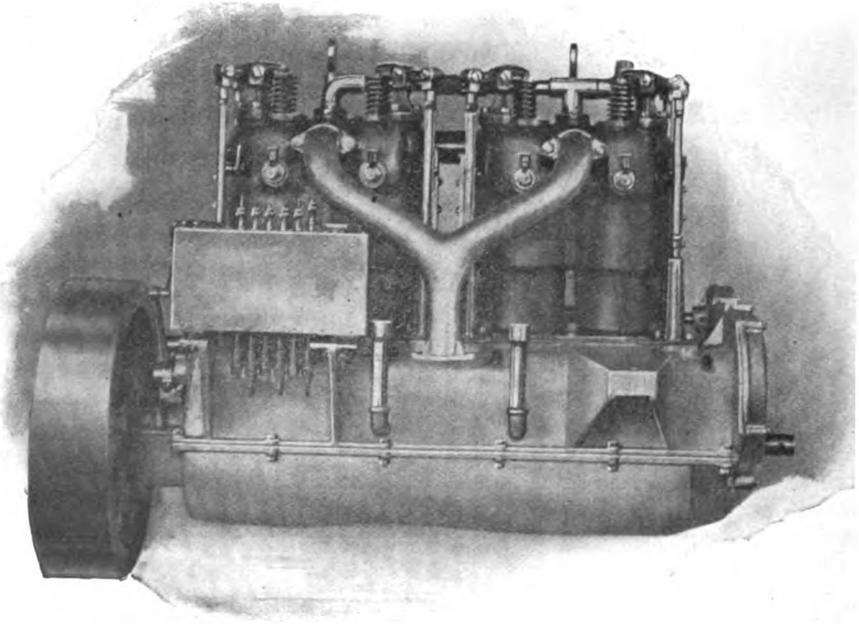

Fig. 3. Motor, Pennsylvania Type D. Cylinders cast in pairs, integral water jackets, valves in the head—water jackets extending between them. Cylinders 4½ inches square. Special lubricating system, as described in the text.

The 16-inch diameter, 70-pound fly-wheel is shouldered against and bolted to an integral flange on the crank shaft. At this point there is an interesting construction, which is used in several places where shafts are bolted together, so that the entire shearing stress does not come upon the bolts themselves, but is taken by shear washers of considerably larger diameter than the bolt. These surround the bolts and are sunk partly into the fly-wheel and partly into the shaft flange, as six or eight of them are used there is no possibility of sheering off the bolts. The fly-wheel is graduated so that any novice can tell exactly the proper valve timing, and if the motor is taken down there is no excuse for the most careless repair man assembling it out of time. The forward end of the aluminum crank case has integral supporting arms, the ends of which rest in pressed steel brackets securely riveted to the side frame members. At the rear two very short arms are provided, which are bolted to a rear pressed steel cross supporting member.

### IGNITION.

A Splitdorf high-tension magneto constitutes the regular equipment. This is mounted on the left side of the engine on an integral aluminum bracket of the crank case. It is driven by a longitudinal shaft from the half-time gears at the front, this shaft being a continuation of that used for driving the gear circulation pump, a flexible joint being of course interposed. Dry batteries are used for starting. No special timer is provided, the magneto serving the purpose of timing and distributing the current. The spark plugs are inserted into the sides of the engine cylinders, and compression relief cocks and cups are carried in the cylinder head.

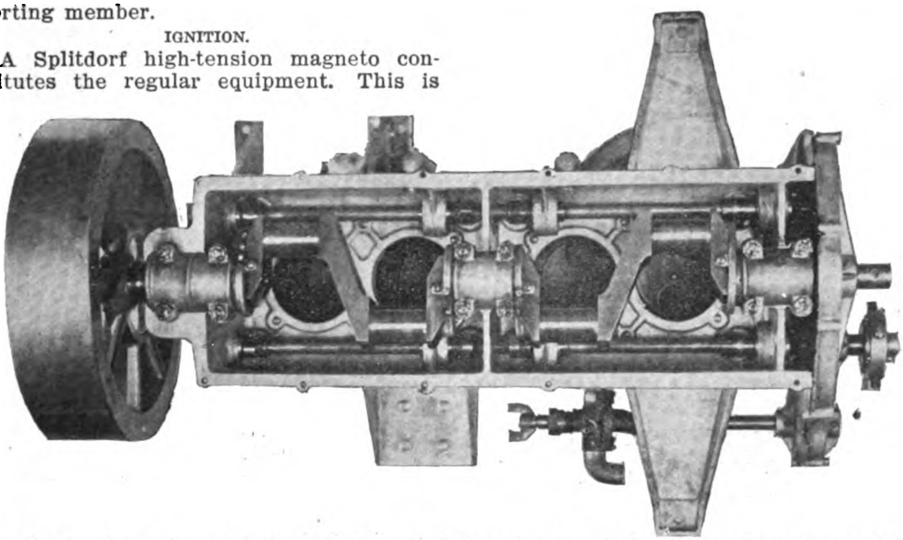

Fig. 4. View of the under side of the Pennsylvania Type D motor, showing the very large bearings of the main crank shaft, each held by four bolts and castellated nuts to the upper half of the case. This view also shows the location of the timer and the integral magneto, and two forward supporting arms. The rear end of the case is very short with integral arms which are mounted on a pressed steel cross frame member.

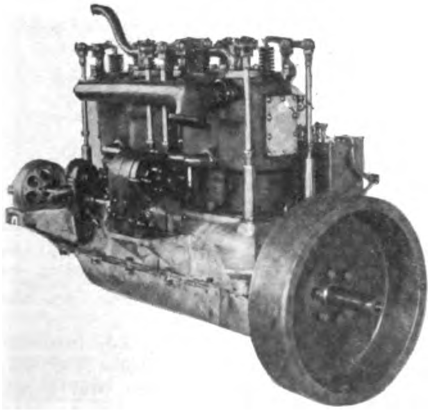

Fig. 5. Exhaust side of Pennsylvania Type D, showing the mounting and driving of the magneto. The overhead valve and lifting rod construction and the protruding end of the crank shaft, upon which the clutch runs and from the inside of which the clutch is oiled.

The circulation pump just mentioned is of the gear type enclosed in a bronze case. It forces water up through the cylinder jackets from the bottom and out of the top to a large Mayo radiator at the front. The water jackets contain an unusually large volume, and even the space between the valves in the heads are water-jacketed, which is unusual for motors of this type. On the pump shaft is a large aluminum pulley, carrying a flat 1 inch leather belt, which drives the ball bearing fan at the rear of the radiator.

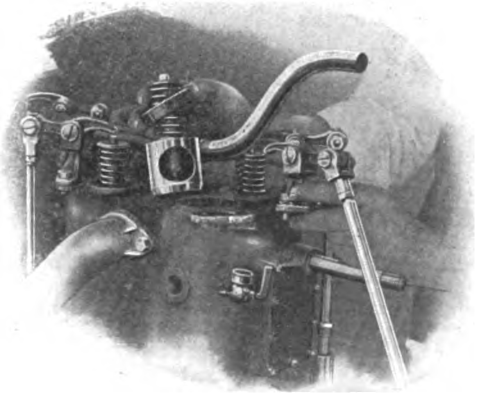

Fig. 6. Detail view of the valves in the head on the Pennsylvania Type D motor, showing how the valve cages, lifting rods and rocker arms can be quickly removed.

The clutch is of the well-known leather-faced cone type, but fitted with cork inserts. It is 14 inches in diameter by 2½ face, and engaged by a helical spring square section and two hundred tension. Just to the rear of this clutch is a special combined universal and slip joint, which in addition to the usual features of the universal can even take care of shafts, the centre lines of which do not meet in a point. This joint mechanism consists of a longitudinal piece with trunnioned arms at right angles to it and to each other at its ends. On the ends of the forward trunnions hardened steel blocks are pivoted, and the same is true of those at the rear. These blocks are arranged to slide in grooves in bronze boxes—one at the forward end and one at the rear end, the boxes being connected by a flexible leather covering, to retain grease and exclude the dirt. The forward bronze box is bolted to the rear of the clutch member, which contains the clutch spring. Shear washers being used similar to those used on the fly-wheel, while the rear bronze box is bolted in a similar manner to a casting carrying a square hole, into which the front end of the propeller shaft is inserted. Small coil springs at each end keep the bar with its trunnion cross arms at its ends in a central position.

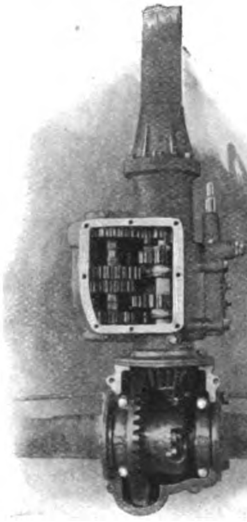

Fig. 7. View showing the compact change speed rear axle and differential. Note the removable tops and the accessibility of the parts. Details in the text.

The forward end of the propeller shaft housing carries a ring, the surface of which is a portion of a sphere. This ring is supported in a hollow lock ring of similar inside surface, which is carried by a pressed steel cross frame member, the combination forming virtually a ball and socket joint, only a zone of the sphere being present, however. This tube acts as a torsion arm, but does not transmit any of the tractive effort of the wheels, as this is carried to the frame through two long distance rods from the ends of the rear axle, the forward ends of which rods are pivoted in hangers on the side frame members in line with the ball supported end of the propeller tube housing. This allows the axle perfect freedom to move up and down, or one wheel to lift higher than the other.

### THE CHANGE SPEED REAR AXLE.

The rear axle construction is of the contained change speed type, the change speed gear case being a part of the rear axle housing. The sliding gear members operate on a square shaft with a four-jawed clutch for the high speed. The forward end of the propeller shaft is carried in a Hyatt roller bearing, while the rear end is squared and fits into the forward end of the pocket gear. The hub of this gear is enlarged and contains a roller bearing in which the end of the square transmission shaft runs. The other bearings of this change speed mechanism are of the adjustable, three-point type, the adjustment being retained by a ring nut, which is locked in position by means of a spring wire in a groove in its circumference, the end of the wire passing through the ring and into the shaft in a radial direction. The counter-shaft is below the main-shaft, and the gears are shifted by two rods operating yokes inside of the case. A very effective automatic lock prevents shifting either of the sliding gear members until the other is in neutral. This simple device, which is shown in the accompanying sketch, operates as follows: Ball A fits into the hollow in gear shifting rod B, holding that rod in neutral position, while rod C is free to move to its proper gear mesh position, in which position it is retained by a spring-pressed plunger, after a well-known manner, and also by a wedge-shaped ratchet arrangement on the outside hand gear shifting lever. Now if rod C is moved into its neutral position, hollow D comes under ball A, rod B can be moved, forcing the ball into the hollow D, thus locking rod C into neutral position, so that it is impossible to move either rod for a gear shift until the other one is in neutral position, precluding the possibility under any circumstances of meshing two speeds at once. This device is one of the simplest and yet most effective ever seen by the writer.

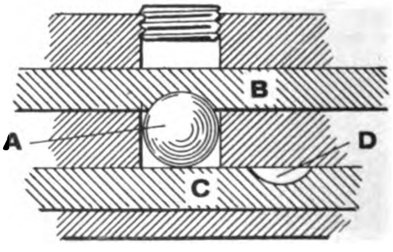

Fig. 8. Diagrammatic drawing, showing the method of locking one gear shifting rod while the other is in engagement, as explained in the text, in connection with the change speed rear axle.

The rear end of the change speed gear

case is rigidly bolted to the differential housing. The top of this differential housing can be removed, there being a horizontal parting line in the centre plane, and the differential can be lifted out. The live shafts of the rear axle are of the full floating type, driving the hubs of the wheels by means of lug clutches electrically welded to the ends of the shafts.

### TWIN BRAKES.

A double set of brakes, both of the internal expanding type, operate side by side upon a single pressed steel brake drum. Each of these brakes are two inches face by twelve inches diameter, the shoes being cast steel lined with "Raybestos." The shoes are cam-expanded, but instead of being pivoted the end of each shoe half simply rests on a supporting pin, so that in case of uneven wear of the brake surface the shoe halfs can lift, and thus engage the entire inside surface of the drum. The emergency brake, operated by the usual side ratchet retained hand lever, is the band nearest to the spokes, as it is the one which is supposed to receive the most sudden and violent applications, while the other is the service brake, which is used more continuously, but not, as a rule, so energetically. All brake rods are without offsets, their pull being direct and not in a diagonal direction. A special equalizer is arranged as follows: The cross brake rods are divided at a point near one side frame member, the ends abutting and being supported by a fixture attached to the side frame member. Arms are attached to each of these two portions of the cross brake shaft, and connected by a whiffle-tree type equalizing bar. The outer ends of the divided brake shaft each carry an arm which connects with the longitudinal rods running to the brakes themselves.

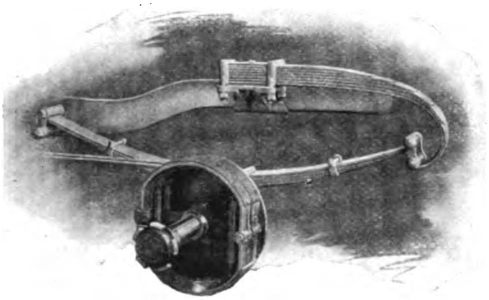

Fig. 9. Detail view of the Pennsylvania Type D, three-quarter elliptic rear springs, and the twin brakes, also the clutch member formed at the end of the floating axle. Brakes each two inches face by 12 inches diameter, Rabestos lined, operating side by side on the inside of a single drum. The one nearest the wheel spokes is the emergency, operated by the outside lever.

The gear shift lever operates in three planes in an H quadrant, being pivoted at its lowest point. When swung outward it picks up a short arm, the forward motion giving a reverse and the rearward motion the low. When swung inwards the lever picks up another short arm, the forward position of which gives neutral and the rear high. When either short arm is engaged, a flat leaf spring locks the other into the neutral position. A thumb button release on top of the gear shift lever prevents going into the reverse position accidentally. The gear ratio on the direct drive is three to one, and all gears are 6-8 pitch.

The steering gear is of the worm and sector type with an adjustment at the upper end. Special steel is used, the cross shaft having a very large bearing, this being 3½ inches in length. The steering arm is a large drop forging, and the drag link is fitted with special ball and socket ends so locked that it is claimed the sleeve cannot spread, allowing the ball-ended rod to come out. The tube is prevented from spreading by a sleeve which screws over the end and is held by a hardened taper pin. A slotted nut is provided for adjusting the spring-pressed blocks forming the ball socket.

The front axle is a drop forging specially webbed, to resist forward or backward displacement as well as for carrying weight. The spring saddles are integral. The upper end of the steering wheel spindles bear against a hardened steel ball, forming a pivot. The spindles are hardened and are mounted in bronze bushings, with a nut and locking pawl at the bottom. The steering arms are fitted to the bottom of the spindle on tapered square ends, and the cross link is to the rear of the front axle and raised for protection. Castellated nuts are used, including those on the spring clips.

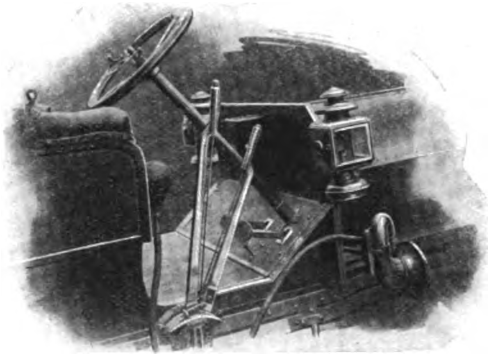

Fig. 10. Control levers of the Pennsylvania Type D car. The gear shifting lever operates in three plains, and is provided with a thumb button release to prevent accidental engagement of the reverse. Brake lever ratchet retained. Inner pedal controls the clutch and the outer one the brake. Emergency lever at the outside is interconnected with the clutch. Muffler cutout button is also shown. No cables are used, all pulls being direct by rods.

The frame is channel section of 7-gauge steel, 4 inches greatest depth, and offset at the sides. At the offset the upper web forms an integral gusset 12 inches in length. Exceptionally large gusset plates are used at corners. The frame is dropped two inches just forward of the rear axle, giving good clearance over the axle and still a low-hung body.

### THE SPRINGS.

The rear springs are three-quarter elliptic with scroll ends, the upper perch centre, riveted to the frame, being two inches to the rear of the lower perch. These springs are 2 inches wide, 38 inches long, 6 leaves below and 7 above. The front springs are semi-elliptic, 32 inches long, 5 leaves perched on top of the axle. A straight mahogany finished dash with brass edge is kept perfectly plain with the exception of a single coil. The bodies are all made of sheet aluminum on suitable wood frames, giving a light, durable construction. All wheels are mounted on ball bearings, and 32 x 4-inch tires are used all round. The wheel base is 110 inches.

The inner pedal operates the clutch alone and the outer the brake. The emergency lever is interconnected with the clutch. A foot button muffler cut-out connected by rods is also supplied. No cables are used anywhere for such connections, all being direct by solid rods. Drilling and location of all parts are obtained by jigs, a very complete system being employed. All parts are interchangeable.

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# The 1909 Locomobiles

HUGH DOLNAR.

The Locomobile Company of America, Bridgeport, Conn., U. S. A., will offer for the season of 1909 a very decided innovation on its previous product of chain-driven cars exclusively, by presenting in addition to its former chain-driven cars a new line of "shaft" drive, 30 horse power cars in which the bevel-gear and divided rear axles are substituted for the counter-shaft with side-chains to the rear wheels. The Locomobile 1909 chain-driven, 7-passenger and 5-passenger cars are shown in Figs. 1 and 2 no material changes from the Locomobile 1908 models, the differences in the two 1909 chain-driven models being only those called for by body and seat placing modifications. In addition to these two continued 1908 models the Locomobile offers two entirely new bevel gear models, no chains, the bevel-gear being regarded with favor for the lighter forms of touring cars and runabouts.

The Locomobile 1909 offering will therefore include four different models, two of 123 inches wheel base, with 4 cylinder, 40 H. P. motors, side chains to the rear wheels, and two having 120 inches wheel base, four cylinder motors of 30 H. P., and bevel gear drive to the divided rear axles, as shown on the opposite page.

### NOTABLE FEATURES

The Locomobile Engineers do not place aluminum in positions where it is required to support important running parts.

Thus the motor base and gear box are high grade bronze, giving a strength about equal to that of steel for these important members. The change gear gives four speeds forward, direct on high, enabling the driver to suit his rate much more closely to road demands than is possible with three forward speeds only. The sliding gear construction details are first class in every particular, chrome-nickle steel, "Heat Treated;" for gears and shafts; the speed change is selective. The bevel gear and pinion are also of chrome-nickel steel, heat treated, and the bevel pinion is supported in the best manner possible, annular bearing at both front and rear ends, with ball thrust bearing. The rear axles, full floating, have squared inside ends and integral driving discs with radial teeth to engage the notched wheel hubs at their outer ends.

The Locomobile Engineers employ, on all "30" cars a very large diameter Brake drum, with a wide internal face, and place both sets of brake shoes side by side inside the closed brake drum, thus equally protecting these vitally important agents from rapid abrasion by dust and sand. This improvement, so obvious has remained unnoticed until very lately.

"Thermoid" facing is preferred to metal-to-metal brake friction.

### THE LOCOMOBILE BEVEL GEAR DRIVE

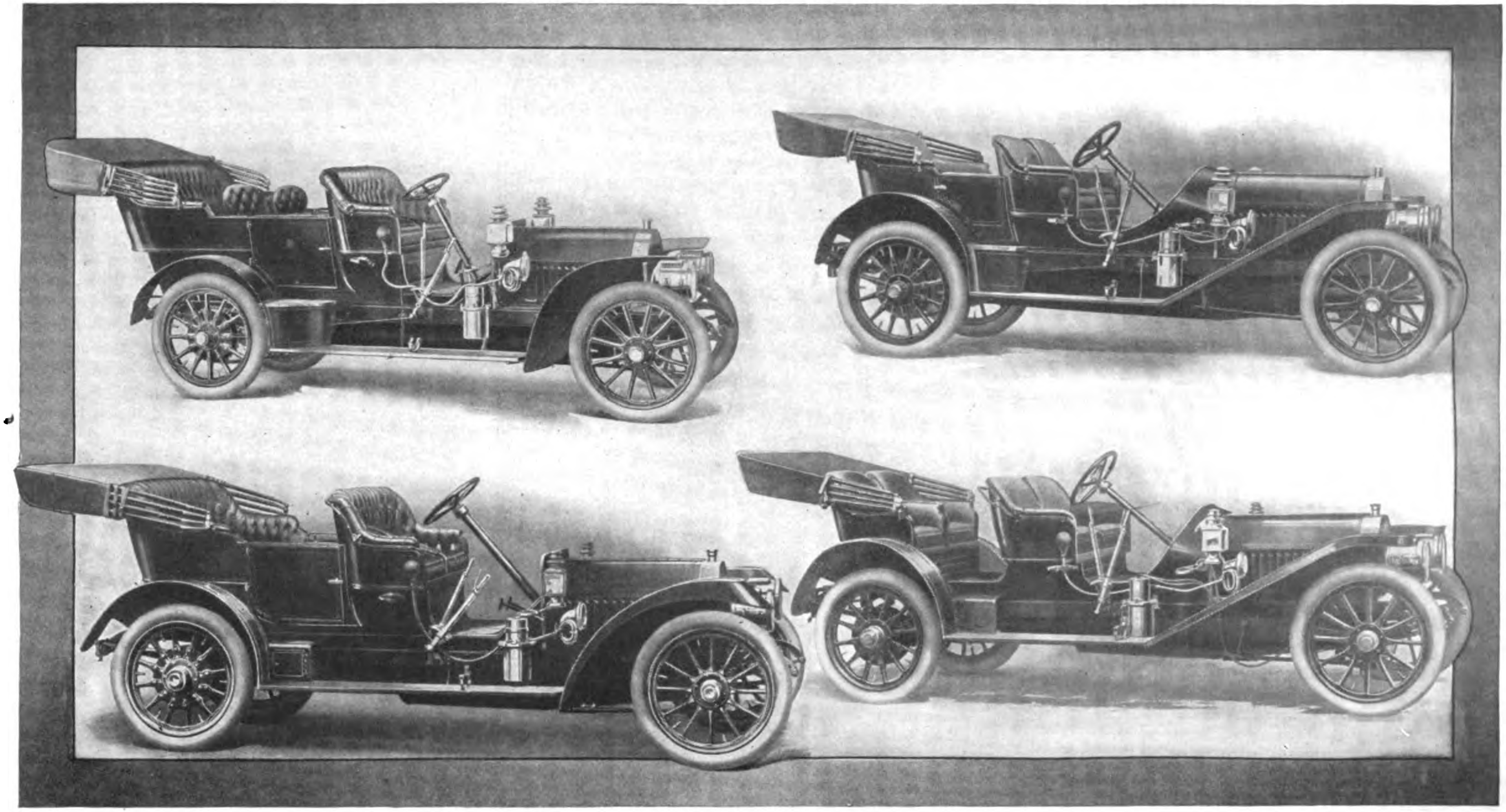
Well aware of the desirability of the bevel-gear or "shaft" drive, the Locomobile began experiments to determine the best form of the bevel-gear drive by placing a shaft-drive car on the road in 1906. This form of drive has been subjected to changes and continual road tests for the past three years and is now placed on the market for the first time in the two Locomobile 30 models, shown in Figs. 3 and 4. In all something like five or six separate and distinct forms and arrangements of bevel gear drive details were very thoroughly tried out on the road before adopting the notably clean and simple arrangement of elements shown in Figs. 5, 6, 7 and 8, side rear oblique, complete plan and partial views of the Locomobile 1909 bevel gear drive chassis, and in Figs. 9 and 11, reproductions of the Locomobile 1909 bevel-gear rear axle assembly working drawings.

### THE REAR AXLE TRUSS ROD

This is ½ inch diameter steel, ends globe-seated in the ball bearing thrust abutments fitted to the axle tube tapers, truss rod members united by a turn buckle, right and left threads, with one retaining check nut.

### THE SPRINGS

The spring continues to be a principal problem of motor car design, every known form of spring having been proposed and tried in motor cars at one time or another, none, sad to say, with entirely satisfactory performances under all conditions—a not surprising result when it is borne in mind



In the upper left-hand corner is shown the seven-passenger touring car, wheel base 123 inches, tires 36 x 4 inches front and 36 x 5 inches rear, motor four cylinders 5 x 6 inches, 40 H. P. Price $4,500, including 5 lamps, mats, horn, tools, etc. Upper right-hand corner, baby tonneau, five-passenger touring car, same chassis as seven-passenger, minor changes to suit the runabout body placing, wheel base 123 inches. Price $4,500. Lower left-hand corner new 1909, 30, shaft-driven, five-passenger Locomobile, wheel base 120 inches, tires 34 x 4 inches and 34 x 4½ inches, four-cylinder, motor 4½ square, four speed sliding gear direct on high, seating capacity five. Price $3,500. Lower right-hand corner Locomobile 30 Runabout, shaft driven, same chassis as the five-passenger. Price $3,500—cape top extra for all models.

that a spring which acts well under some road surface and speed conditions is not at all suitable where those conditions or the spring load are much changed. The difficulties of car springing give interest to all adopted spring dimensions, determined, as they commonly are, by a costly and heart breaking course of substitutions with no really satisfactory result. The Locombile springs' principal dimensions, all half elliptic forms, for the specified four 1909 models, are as follows:

For the 40 H. P. models, chain driven, the front springs are all 40 inches long, 2 inches wides, 7 leaves. The Locomobile 40 rear springs are varied for different body forms and weights as below: 7 passenger standard touring car, rear springs 50 inches long, 2 inches wide, 9 leaves. For the 40 runabout the rear springs are 50 inches long, 2 inches wide, and have 7 leaves. For the 40 limousine the rear springs are 50 inches long, 2 inches wide, 9 leaves. The Locomobile 1909 30 rear springs are as follows: 5 passenger car, 48 inches long, 1¾ inches wide, 7 leaves; 30 runabout, rear springs, 48 inches long, 1¾ inches wides, 5 leaves; 30 limousine, rear springs, 48 inches long, 1¾ inches wide, 8 leaves.

All Locomobile springs have graded leaf thicknesses, all have the spring-eyes steel-bushed, with 7-16 diameter steel pins. The spring leaves are tongued and grooved and are retained sidewise by the two spring-perch-clips, and endwise by a middle bolt down through all the leaves of the springs. The three longer leaves are banded together near the third leaf end. Each spring eye is lubricated by an individual heavy grease cup.

### THE BRAKES

See Figs. 9 and 10. The brake drums, steel castings, are 14 inches inside diameter, about 4 inches inside face depth, with two sets of internal, cam-rocker expanded shoes, one sleeve rocker, and one solid rocker journaled in the sleeve rocker.

The internal expanding brake shoes, in halves, two complete shoes in each brake drum, are malleable iron castings, jointed in the middle, and faced with "Thermoid" 1½ inches wide by 3-16 thick, fixed to the brake shoe metal by 3-16 diameter copper rivets. See Fig. 10. The brake shoe joints are half circles only, bearing on the two sides of the cylindrical, independently supported, shoe pin, and closed by coiled springs at both ends. The stud and rocker are supported in applied steel casting brackets.

### IGNITION

The Locomobile fits the hammer spark with home made low tension magneto and helical cam spark timed advance, unquestionably the simplest and most certain in action of all ignition equipments. The Locomobile Engineering Department is very strong in electric applications, and the ignition as specified is most reliable. Iridium contacts are used in the hammer spark action.

Lubrication is by mechanical oiler and splash pool. All bolt heads are hardened.

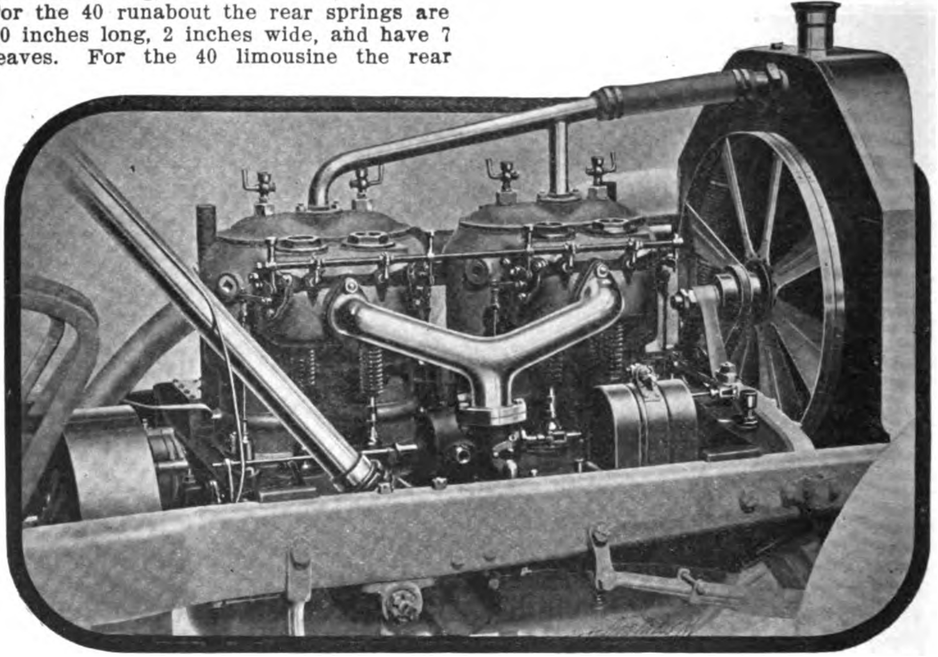


Fig. 2. Intake side of motor in place in chassis. Low tension magneto, and hammer spark, carburetor hot water jacketed. Magneto made by Locomobile Company. The spark advance is had by moving a spiral camshaft endwise. The dual unit cylinder water jackets have a large applied top part, giving access to the interior of the water jacket for inspection and cleaning. The general form and construction of the Locomobile motors is continued from 1908, the only change of importance being in the form of the bronze motor base, which has been extended.

The Locomobile makes a very large use of drop forgings, home production, all of which are "heat-treated."

### REAL SIGNIFICANCE OF "HEAT TREATED"

"Heat-treated" is a term glibly used in the past year or two by sales agents and trade-paper writers who have not the shadow of an idea of what this general term really means, implies, and stands for.

"Heat-treated is a general term, with no specific meaning, a horse shoe in course of forging at a cross roads smithy being "Heat-treated" just as truly as a chrome nickle bevel-gear ring for a high-grade motor car rear axle.

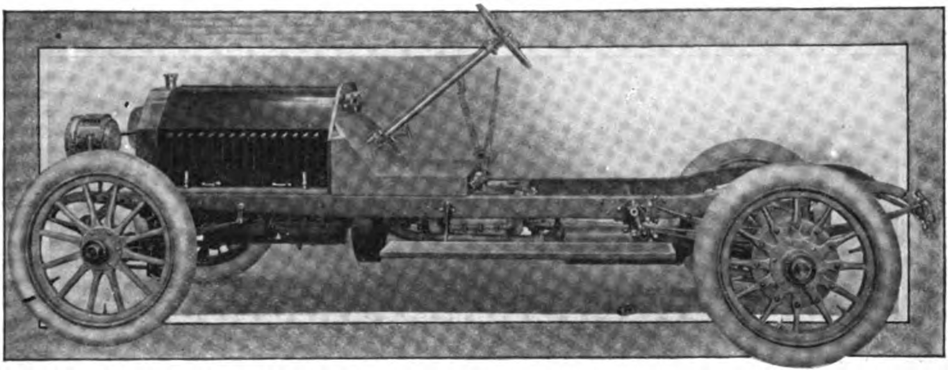


Fig. 3. Left side elevation of Locomobile 1909 new bevel gear drive chassis. The chassis frame, pressed steel, is of uniform width throughout the rear ends of the chassis frame sides being raised over the rear axle to give vertical travel room, struts, revolubly seated on the rear axle casing, are carried forward to dropped brackets fixed to the chassis frame sides, as shown in this illustration. The struts, revolubly seated on the rear axle housings of the bevel gear driven cars, in connection with the coiled spring retained torsion arm, relieve the springs from all propulsion and torque resisting stresses.

"Heat-treated," as used by intelligent machine constructors, means simply that heat has been used in such a way, determined by experiment, as to leave the heat-treated tool or machine component in its best conditions as to hardness, softness, tensile strength, etc., according to the nature of the materials used. It is possible with the modern steels to get almost any result desired if intelligent heating treatment suited to the particular composition of the steel in hand is employed. During the last fifteen years, or since the introduction of the automobile, there have been introduced so many new steels containing various alloys in varying proportions that what was known previously does not apply in any great measure to the working of these new alloyed steels, and the peculiar heat treatments are the result of costly experiments. Heat treating therefore simply means subjecting the ma- and cooling as will terials to such heating bring about the desired results as to tensile strength, elasticity and so on which the construction material permits, and may vary from mere baking to blue color in the oven of an ordinary cooking stove, as in the case of soft steel jig-saws, to the most elaborate furnace heating with pyrometer control and quenching in various kinds of water or oil cooling baths.

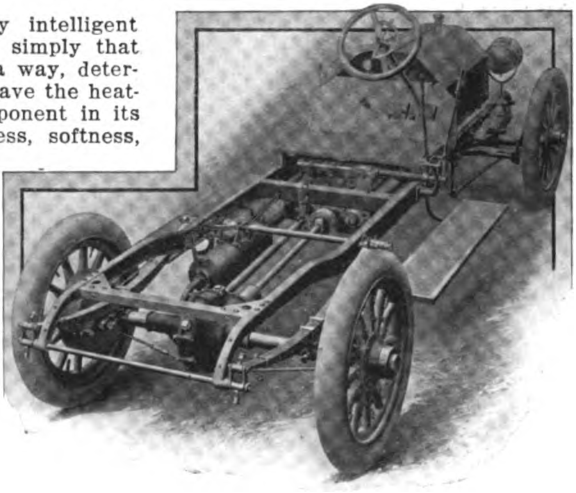


Fig. 4. Locomobile 1909 bevel gear drive chassis, rear oblique view, showing general arrangement and support of rear springs and rear of chassis frame, appearance of rear axle casing and bevel gear housing and torsion arm forward end coiled spring constraint. The rear springs are revolubly mounted on the rear axle casings. A truss rod, screw turn-buckle tension adjustment, check-nut retention, is placed under the bevel gear housing to carry this large member and its vitally important contents.

Every Locomobile steel-forging, irrespective of analysis, is "heat-treated," treatment varied to suit the analysis, or composition of the particular steel used, and also varied to suit the office or employment for which the finished machine component is intended.

In reply to a request for a general definition of this term "Heat-treated," Mr. E. F. Russell, Locomobile Factory Superintendent, said, in substance:

"The heat treating of alloy steels, such as chrome nickel, really begins with the forging. It is necessary to preheat these steels slowly to a low heat where color is just visible. The blanks, in the case of gears or pieces of stock for levers or axles, are then heated rapidly to the forging heat and reheated as often as necessary to keep the metal ductile for the forging operations. Too high or too low a heat during the forging seriously interferes with the heat treatment which follows:

Immediately after drop forging the forgings are reheated to an annealing heat and annealed. Next operation is to heat for the first quenching. The immersion is in oil or water as the steel demands. The part is then reheated, a long slow heat required, and is then annealed. In this condition the steel is ready for machine operations. It is also ready for finished parts, where the parts are not to be tempered, such as gears.

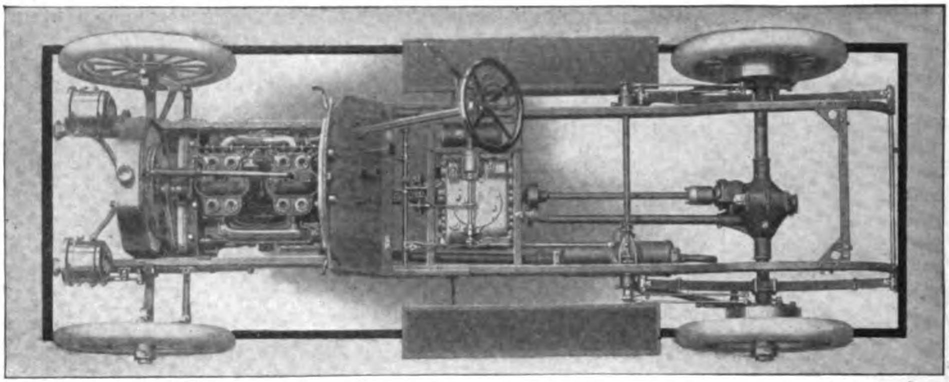


**Fig. 5.** Locomobile 1909 bevel gear drive chassis plan. This illustration, in connection with Fig. 4, gives a clear idea of the forms and placing of the principal elements of this new Locomobile bevel gear chassis and is worthy of close study.

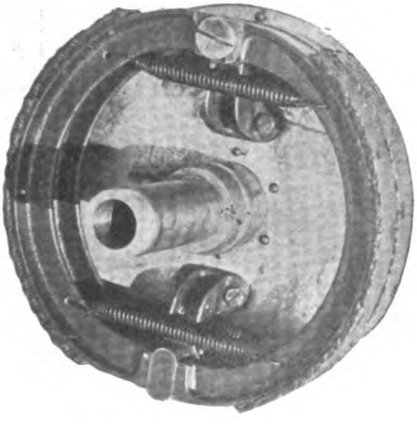


**Fig. 6.** Locomobile 1909 bevel gear drive brake assembly, wheel removed, showing internal expanding brake shoe arrangement, support and construction.

In case of gears the heat treating continues after the teeth are cut; the gear being then finished by heating to the proper temperature and immersing. The temper is then drawn to a degree that puts the tooth in proper shape to resist wear and prevent breakage. The proper temper or degree of hardness is determined by the compression method of inspection. A certain pressure applied to a ball or round end prick punch must make an indentation of given depth.

Carbon steels require much the same treatment, but not so elaborate and difficult, the line of demarkation between right and wrong with carbon steels being much easier to determine."

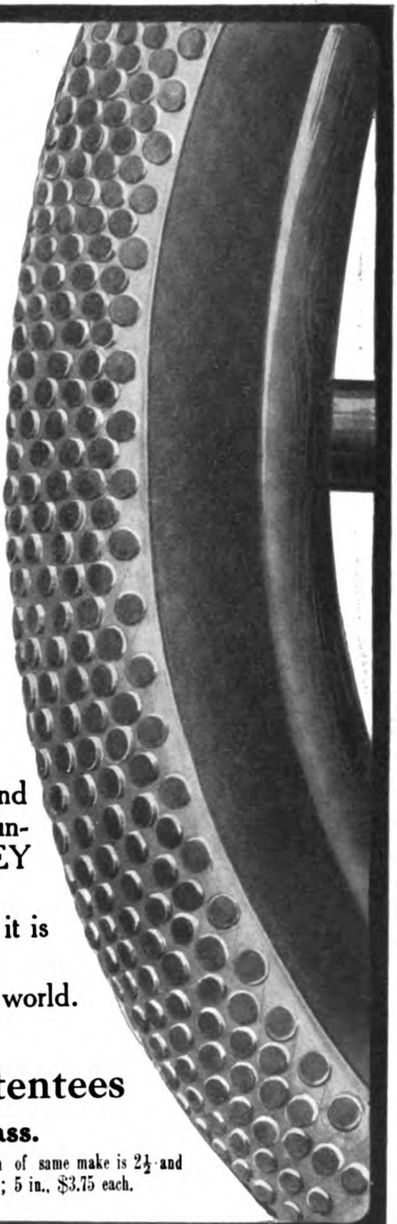
### CONTROL

There are two outside hand levers, the latched outside lever when pulled backward first disengages the clutch and then applies the outside set of internal brake shoes. The inside hand lever is in two slots only, and selects the speed change by a very simple and ready handling. The spark and throttle levers are on top of the steering wheel, but do not turn with it. The steering gear is a hardened chrome-nickle steel worm and sector. There are two large pedals on the foot board, the left one pushed forward to disengage the clutch and the right one pushed forward to apply the inside pair of internal brake shoes, this system of pedal actuated shoes constituting the ordinary brake, differing only from the emergency brake action in not being interlinked to disengage the clutch before applying the brake. There are two plunger pedals on the foot board, one for the accelerator and one for the muffler cutout.

There is also a hand operated plunger oil pump placed on the foot board, on the runabout and on the dash of the touring car used by the driver to supply the splash pool.

### ON THE ROAD

Wednesday, November 25, 1908. A 1909 Locomobile 30 H. P. Runabout, H. F. Mitchell, driver, Mr. Barrett, passenger and the writer observer, left the Locomobile factory at Bridgeport at 9.46 A. M., start of run to Hartford and return, 120 miles round trip. This runabout chassis, 120 inches wheel-base, had done about 2,000 miles road work, but had a new red body, seats for four. At Hartford Mr. Barrett was left and the return trip to Bridge-



The rubber studs forming the

# BAILEY "Won't Slip" Tread Tires

to prevent **skidding** and give perfect **traction** were the **correct principle** to start with.

After being in general use for over eight years on Automobiles, Motor Cycles and Bicycles in the United States and Europe, the principle of the BAILEY TREAD has proved to be **absolutely correct.**

Twelve of the largest **tire** manufacturers in the world (nine in the United States and three in Europe) endorse this as licensees under the patents to make and sell the BAILEY TREAD.

In fact the principle is so **perfect** that it is **impossible** to produce a substitute.

For sale by all dealers throughout the world. Write us for descriptive booklet.

**C. J. Bailey & Co.,** Patentees

**22 Boylston Street, Boston, Mass.**

N. B.—The extra cost of the BAILEY TIRES on the List more than smooth of same make is 2½ and 3 in., $1.50 each; 3½ in., $2.00 each; 4 in., $2.50 each; 4½ in., $3.00 each; 5 in., $3.75 each.

**LICENSED MANUFACTURERS—in the United States**

The B. F. Goodrich Co., Akron, Ohio
The Diamond Rubber Co., Akron, Ohio
The Fisk Rubber Co., Chicopee, Falls, Mass.
Hartford Rubber Works Co., Hartford, Conn.
G. & J. Tire Co., Indianapolis, Ind.
Goodyear Tire & Rubber Co., Akron, Ohio
Morgan & Wright, Detroit, Mich.
Empire Automobile Tire Co., Trenton, N. J.
Consolidated Rubber Tire Co., New York City

**LICENSED MANUFACTURERS—in Europe**

The B. F. Goodrich Co., 7 Snow Hill, London, E. C., Eng.
The North British Rubber Co., Edinburgh, Scotland
Hanover Rubber Co., Hanover, Germany

port was made with the driver, Mr. Mitchell, and the writer only.

The fog of some days' standing was thick as ever, turning to fine rain at intervals and the road was very slippery as long skidding at the first corner turned on pavement showed us plainly. Mr. Mitchell is a very careful driver indeed, and in all this 120 miles run was far away from everything in the road, in spite of the slithery surface. We had hoped for a quick run, as the car can do 55 miles with ease, but pace was impossible as the hind wheels tried to pass the front ones as soon as even half-power was applied. This 1909 Locomobile 30 Runabout handles to perfection, but Mr. Mitchell was taking no eyelash chances at all, and as very little indeed of road between Bridgeport and Hartford is straight-away, continual curves being the rule, we made most of the run at somewhere around 30 miles, touching 54 or 55 miles, as indicated by the Jones speedometer, only at widely separated times, and then for but very short distances.

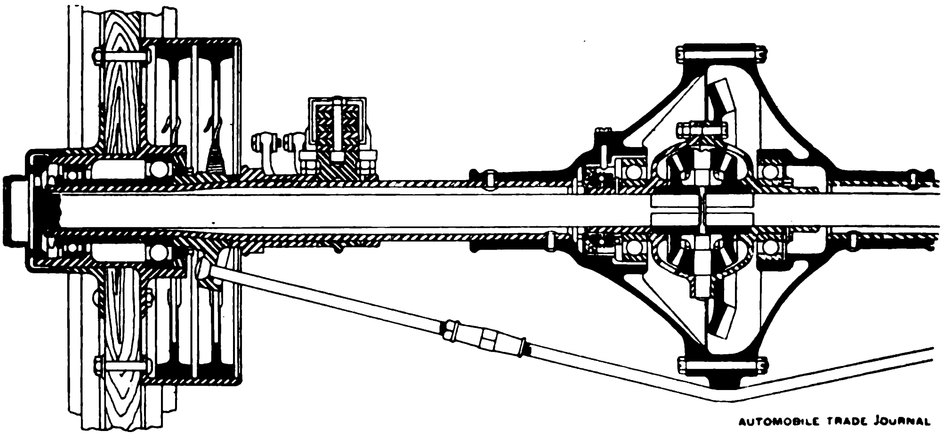


Fig 7. Locomobile 1909 bevel gear drive axle assembly working drawing reproduction. Beginning with the propeller shaft, which is arranged so as to be about horizontal when the car is loaded, a universal joint is placed at each end, telescoping in the rear. The propeller shaft is of chrome-nickel steel 1⅝ ins. dia., solid. The bevel pinion and gear are steel, hardened and tempered with great care. The speed reduction is 3 3-14 to 1 in the pinion and gear. The pitch is 4 d. p., face 1⅝ ins. 14 pinion teeth, 45 gear teeth. The bevel gear ring is bolted to the balance gear casing by the same bolts which unite the two balance gear casing members, and the casing hubs are in imported annular bearings, balls 11-16 dia. The bevel gear thrust is taken by a ball thrust bearing in the bevel gear housing. The divided live rear axle members full floating, are chrome nickel steel, have hardened squared inside ends, and integral clutch disks with radial hub-notch engaging members at their outer ends, and are 1⅝ ins. dia.

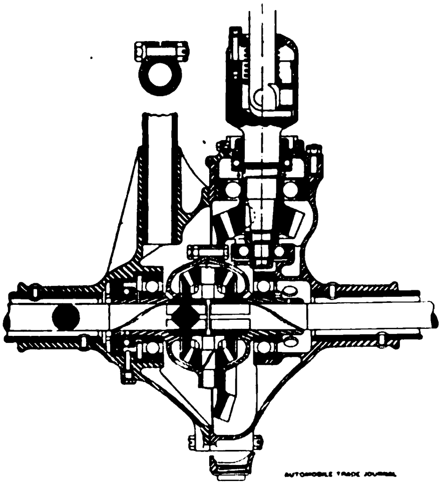


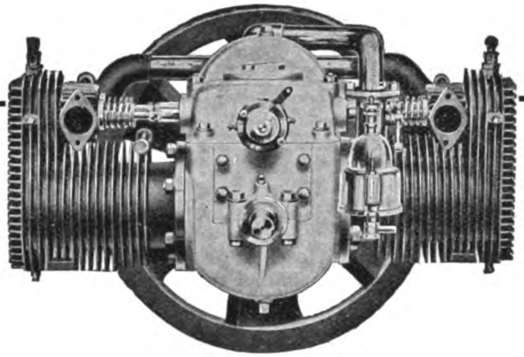
Fig. 8. Section Plan of Locomobile 1909 bevel gear housing and contained element. Imported annular bearings only are placed in the 1909 Locomobile cars. It will be noted that this construction is excellent in every particular, while the bevel pinion support is elaborate, a thrust bearing and large ball annular bearing in front and also an annular ball bearing in the rear of the bevel pinion.

The route was through New Haven, where the cape top was put up and the mica curtain unrolled after we were well wet down outside, and we held on through Wallingford, Meriden, Berlin and New Britain to Heublein's, Hartford, at 1.05 P. M. We made two halts in New Haven on errands, otherwise the run was non-stop, though often at walking pace, as Mr. Mitchell had made up his mind that he wanted plenty of room to save the paint on the red runabout body. This made our total time, stops included, 199 minutes for the 60 miles to Hartford.

The car passed under the Asylum Street Railway viaduct, Hartford, at 2.12 P. M., being then driven non-stop, save for two momentary pauses, one to work the hand oil-pump, and at the draw bridge at Bridgeport when there was a 5-minute delay, the 30 Runabout reaching the Locomobile factory at 5.09, making the return run, 60 miles, in 172 minutes, only 27 minutes better than our run out with two stops in New Haven. It required 12 gallons of gasoline to fill the tank at the end of the run.

Throughout this 120 miles in rain and fog, on slippery roads, there was no delay nor adjustment of any sort.

**Air Cooled**



**Fourteen H. P.**

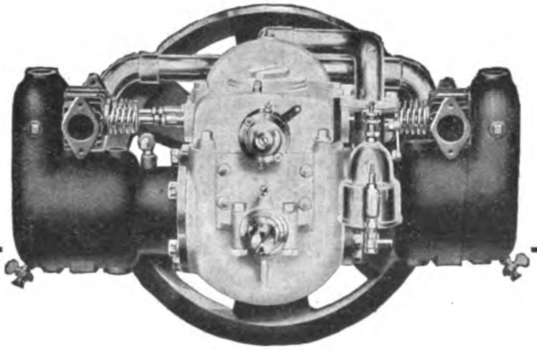
Our "MODEL K" Motors are the engines par excellence for buggy-type automobiles and light delivery wagons. The number of "Model Ks" in actual service proves that. If you want to be sure that your cars of this type are correct for next season, use "MODEL K" motors and your customers will have none but words of praise.

# Speed Changing Pulley Co., Anderson, Ind.

"MODEL K" Motors are made in either air or water-cooled types, the former developing 14 H. P., the latter 16 H. P. Both models are perfectly balanced, have off-set cylinders, straight connecting rods, and mechanically operated valves. Over-all dimensions are: Length—27½ in.; width, 15⅜ in.; depth, including fly-wheel, 19½ in.

We are makers of the famous CARRICO engines, which is a guarantee that these later models are correct in design, and high grade in material and finish.

**Water Cooled**



**Sixteen H. P.**

# The Model B Brush Runabout

The Brush Runabout Company of Detroit, Mich., offer a light car of low cost equipped with a single cylinder vertical engine and two speed and reverse planetary change gear. This car is somewhat similar to the first Brush car, but for 1909, many refinements in design and materials are employed. An instance of this refinement is found in the engine proper. Here the power at rated speed has been increased from about 6 b. h. p. to a fraction over 7 b. h. p., without altering cylinder dimensions, valve sizes, port dimensions, etc., due simply to refinements in carburetion, ignition and valve timing.

The car chassis, 74-inch wheel base and either 56 or 60-inch tread, as desired, fitted with two seat body and rear carrying space sells for $500 with 32 by 2-inch solid tires and for $550 with 28 by 3-inch pneumatics. The company furnishes extra sets of wheels together with tires, sprockets (front and rear), and chains for $160 and $110 for pneumatic and solids respectively. The reason advanced for furnishing these extra wheel and driving sets is that, when one has both, a quick change can be made from one to the other and thus the car be made to give the maximum of satisfaction under all road and speed conditions. In general, the company advises pneumatics for use over poor city pavements and for average speeds of over 15 miles per hour, and solid tires when the average running speed is lower, the roads soft or deep with mud.

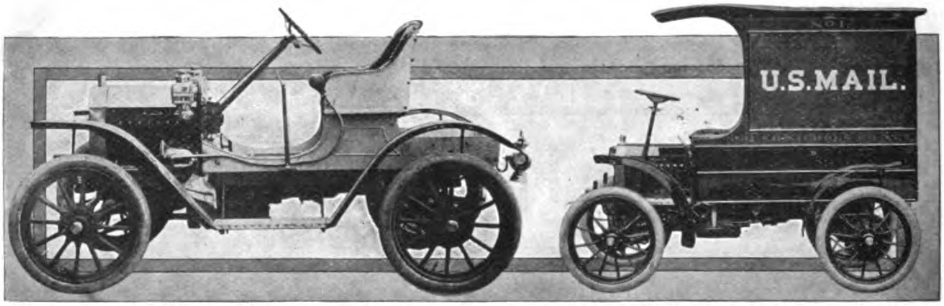


Fig. 1. Views of the Brush Single Cylinder Runabout and Light Delivery Wagon, both using the same chassis. This car has a single cylinder, four-inch bore and stroke, seven H. P. motor, specially balanced to make it vibrationless, and the car is mounted on four vertical helical springs and shock-absorbing arms. Price $500 with 32 x 2-inch solid tires, or $550 with 28 x 3-inch pneumatic tires.

### BUILT TO USE SOLID TIRES.

While pneumatics are regularly fitted, as above, the car has been designed thruout with the use of solid tires in view. The working out of the design along this line is seen in almost every feature of the chassis: wooden frame sills and end members, helical spring suspension with shock absorbing radius rods, large section steering knuckles and axle ends, low gearing ratios, and last, and most distinctive, the employment of large diameter, round section wooden axles. With solid tires, the chief difficulties heretofore encountered have been fatigue and breakage of axle parts and in fact all running gear parts between the springs and the road surface. These destructive effects of vibration from solid tires have been in this car minimized and eliminated by a reduction in car weight and speed (30 miles per hour maximum with pneumatics and high gearing ratio) and a substitution of wood, which is less subject to fatigue and entirely free from crystalization, for axle material. Upon the ends of the wooden axles are fitted high grade steel parts forming the steering yokes, ball and socket spring seats, and the rear wheel journals and brake supporting and operating mechanism. The total car weight, without passengers, is with full equipment between 900 and 1,000 lbs. Each axle, before the application of the steel truss rods, is subjected to a load equal to the car weight applied at its central point, it being supported at its extreme ends. Since only approximately one-half of this load can ever be applied to the axle in service, and since in service the points of application of this load are near the extreme ends of the axles (see location of spring seats in chassis plan) it is very apparent that the factor of safety in these axles is unusually high. The makers claim a safety factor for these parts of between 20 and 24. The four frame members and both axles are made of either oak, maple or hickory and are all impregnated with oil to make them weather proof even after the paint becomes worn off or chipped.

All frame corner brackets are mortised in and bolted in three directions. Each end of the two cross frame members has bolted to it a bracket which carries the lower end of a heavy, helical spring of rectangular cross section. As shown in the spring section herewith, the top of the coil is closed and rigidly attached to the top of a steel rod provided with an integral ball of large diameter on its lower end. The ball seats universally in a spherical socket and is nut retained and enclosed with lubricant in a leather casing, not shown. Each helical spring is tested to an elongation of twice that possible after assemblage and any showing permanent set under these conditions are rejected. Due to the spring action elongating or stretching the spring, as shown, it is impossible for the springs to be affected by rebound, since, in such case, they simply close to their limit and that is all there is to it.

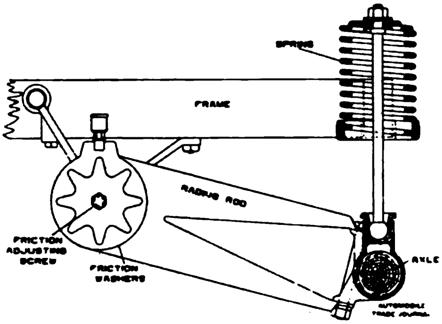


Fig. 2. Detail view of the peculiar Brush Runabout helical spring and shock absorbing radius rod. This view also shows a section of one of the solid wooden axles.

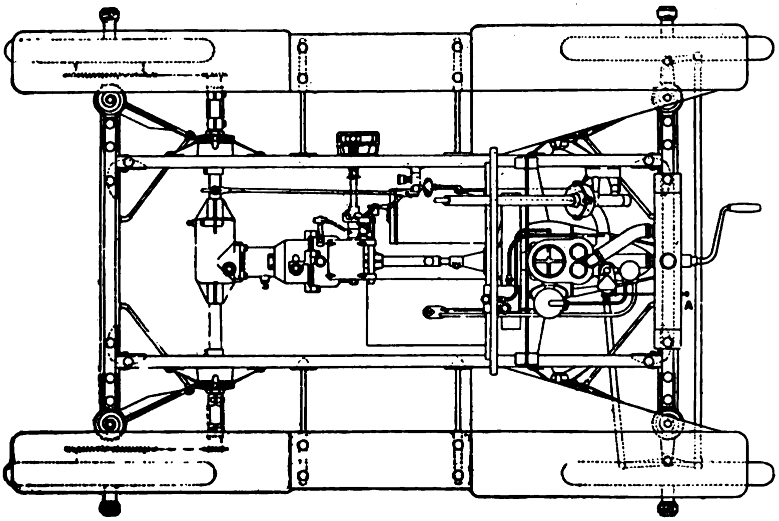


Fig. 3. Plan of the Brush Runabout chassis, showing the location of the engine in a vertical position under the hood at the front, also the arrangement of the special planetary change speed gear case operated by side lever, and also the jack shaft with side chains to the rear wheels. The wheel base is 74 inches, with either 56 or 60-inch tread, as desired. The frame as well as the axles are wood. The car is geared for about twenty miles an hour at 1500 revolutions of the engine, if fitted with solid tires, and about 25 miles an hour at the same engine speed when supplied with pneumatics, solid tires being recommended by the makers when the average running speed is less than 15 miles an hour and over soft or muddy roads.

SHOCK ABSORBING DEVICE.

Probably as interesting a feature as there is on the car is shown in this same cut. Reference is here had to the radius rods, which construction will be clearly understood by co-reference to the chassis plan. Supported by brackets riveted to the frame side members are two stationary discs or plates between which work the disc shaped forward ends of the pressed steel radius rods. Star shaped pieces of spring steel together with through bolts provide an adjustment of the amount of friction set up between these discs, the friction surfaces of which are lubricated from grease cups as shown. This method of supporting the forward ends of the radius rods incorporates a shock absorbing device at each corner of the frame and serves to steady the car over rough roads and at the same time makes possible the employment of the extremely flexible and sensitive helical springs. This combination of very lively spring suspension with adjustable dampeners is a long step in the solution of the solid-tire-easy-riding problem. The method of diagonal trussing of the radius rods to the axles to prevent side swipe is well shown in the chassis plan. Each wheel is carried on two ball races, the inner being of 3 inches diameter with ⅝-inch balls and the outer bearings of 2 inches diameter with ⅜-inch balls.

Brass bound running boards are carried upon forged step irons bolted to the side members and further trussed by under-running rods extending across the car. Flanged fenders are mounted on forged rods bolted to the frame cross members and to the ends of the running boards. The bodies are free and unencumbered and carry no parts of the mechanism—even the gasoline tank being suspended from the frame.

THE ENGINE.

Many distinctive and ingenious features are found in the engine. This is of the single cylinder vertical type mounted in front under a hood. The cylinder is of 4-inch bore and stroke with inlet and exhaust valves side by side in a single combustion chamber pocket and operated from the same cam shaft through individual cams and roller ended cam followers. The cylinder walls and jacket walls are integral as in average practice, but the cylinder head is removable and screws into the cylinder, seating gastight upon a tapered seat. This construction makes the working parts very accessible, since all that is necessary when it is desired to remove the piston and connecting rods from the engine, is the removal of the cylinder head and a disconnection of the connecting rod big end from the crank pin. With the cylinder head removed, the entire combustion chamber wall surface can be seen and all carbon deposits readily removed. Screw plugs permit of the ready removal of both valves. Cooling water circulates thermo-syphonically thru the jacket, entering just below the valve chamber and leaving at the top between the two valves, and a large capacity cellular radiator of small size mounted in front.

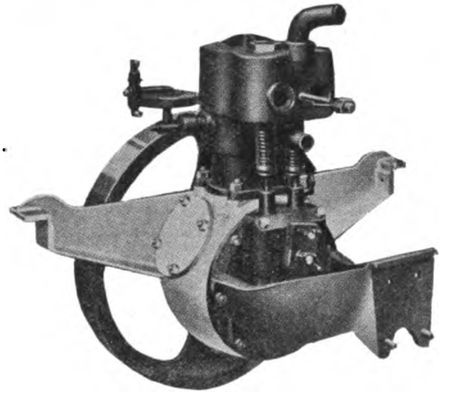


Fig. 4. Brush 7 H. P., 4-inch bore and 4-inch stroke engine, showing three-point suspension supporting arms, water connections valves, cam chamber, crank case hand hole, peculiar pulsation gasoline pump on the front and the very large flywheel.

An aluminum crank case, having two heavy L section integral arms for attachment to the frame side members, is employed. This case is of the so-called barrel type, the main crank journal boxes being formed in end plates, the forward of which bolts up to the case casting. These boxes are bushed with nickel babbit, and because of this construction and the ample sizes of the bearing surfaces (3 3-16 inches by 1¼ inches for the front bearing and 3 3-16 by 1⅜ inches for the rear or flywheel bearing) extremely long life together with a maximum of accessibility is had. The front journal plate, of cast iron, has bolted up with it a very rigid supporting arm which rests upon and is bolted to the front frame cross member, completing the triangular or three point motor suspension. This front journal plate also carries the cams and cam shaft in a chamber separate from the crank case, but which communicates with the latter and secures its supply of oil therefrom. In the photographic elevation of the engine herewith, is shown the motor suspension and general appearance of the engine, minus the carburetor and exhaust pipe. It is worthy of note that the starting crank is carried in a flanged bearing box which bolts to the forward end of the front suspension arm by means of the two studs shown. In this way the starting crank is made a part of the engine unit and its perfect alignment with the crank shaft is insured at all times.

### CRANK SHAFT DETAILS.

In the line section through the crank case it will be noted that some points in the design are as original as they are meritorious. The large external flywheel on the rear, driving end of the shaft is drawn up on a tapered portion and retained by keys and nut. The crank shaft is a drop forging and is machined to size all over. The butts of the crank webs are milled square and have fitted to them a novel form of counterweight. The counterweights are steel castings, strongly webbed and retained by studs and castellated nuts as shown. The outer parts of these weights are cast hollow and are filled with lead, which material lends itself to easy working by the assemblers when the reciprocating and rotating parts are finally balanced with reference to each other.

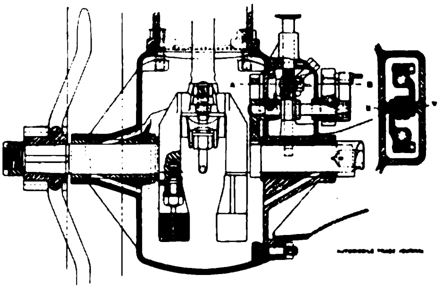


Fig. 5. Cross-section of the Brush single-cylinder engine crank case, showing counter weights filled with lead, the return oil ways from the main bearings into the case, the cam gears and the small double cam shaft in its case above the main shaft. At the right is shown a horizontal section on the line A, B, through the cam-follower rollers, as described in the text.

For light runabouts of low power and medium speed there can be no engine type so cheap to operate and maintain as a single cylinder. This is a fact which is well known generally. It makes for simplicity, low first cost, ease of adjustment, requires a minimum of care, can be made of maximum accessibility, etc., almost without end. But there is one point inherent in its type which has caused it to lose favor—proneness to excessive vibration unless most carefully and accurately balanced. However, a single cylinder engine can be balanced to the elimination of injurious and unpleasant vibration if careful and intelligent application of counterweights is made. This has been done in the engine under discussion and will be reverted to in that part of this description which deals with the road performance of the car.

All crank shaft journals are ground to size and run in boxes which are scraped to an accurate running fit. Each bearing is provided with large oil ducts thru which oil enters the bearings from the crank case splash, and also with passages provid- for the return of oil to the case after it has performed its function in the journals. The bearing boxes are fitted with special circular grooves which prevent the throwing of oil from the case at the points where the crank shaft extends through. The end thrust of the crank shaft, none of which is due to the drive but simply that due to the weight of the shaft itself when the car stands in an inclined position, as when ascending or descending a grade, is taken upon two steel thrust washers as shown. To the external forward end of the crank shaft is pinned a single tooth face ratchet for engagement with a pin set into the inner end of the starting crank spindle.

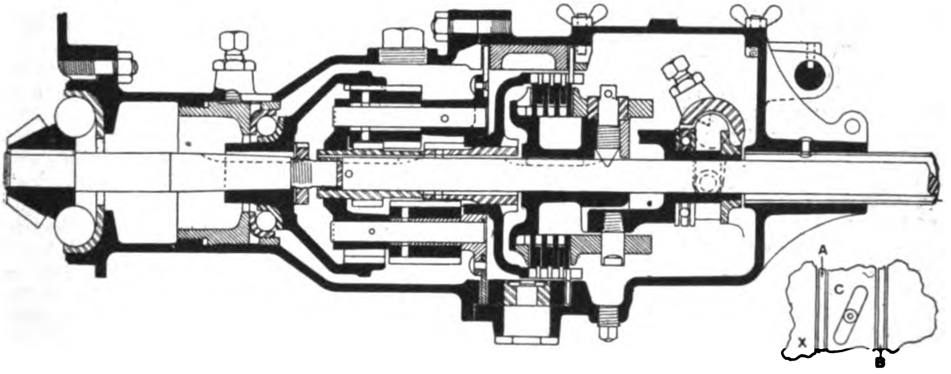


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Fig. 6. Sectional view of the Brush enclosed planetary change gear. This change gear forms a unit with the jack shaft illustrated in Fig. 8, and is suspended from the side frame members by the jack shaft brackets and in front at a single point, thus giving a three-point suspension. Plain and ball bearings are used, and instead of fans acting on drums friction rings, as described in the text, are employed giving exceptionally smooth action.

### THE CHANGE GEAR.

Set into the flywheel hub and parallel with the crank shaft are four studs of high grade steel over which fits a steel member keyed and clamped upon the forward end of the driving or primary change gear shaft. In the sectional view of the change gear, these parts are shown clearly. The driven shaft is free in an endwise direction, with reference to the engine, and can thus communicate no thrust to the engine crank shaft.

The change gear provides two forward speeds and one reverse and is of the internal spur gear type. The action of this gear is the same as that of other change gears of this type in so far as the functions of the gears themselves are concerned; but the methods of securing the several speeds, or rather means for the detention of the members which give these speeds, are original. Referring to Fig. 6, it is seen that clutches of the disc variety take the places of the conventional brake bands acting upon drum surfaces.

In the Brush change gear, it is sought to assist the maintenance of gear quietness and efficiency through so designing the detention members that the bearings shall be relieved of all unnecessary work. To this end, there are two bronze discs riveted to the low speed and reverse elements, which in most planetaries consist of drums with brake bands, indicated as A and B in the sketch at the right of Fig. 6. Between the discs A and B is placed a ring with finished ends and which fits freely in a bore in the housing. The two members of the housing also have finished ring surfaces which present themselves to the outer surfaces of these bronze rings. The ring, marked C in the drawing, has bolted to it a lever which extends through a slot in the wall of the housing and is connected to the control mechanism by linkage in such a way that it may be made to rotate in either direction within its bore in the housing, depending upon the direction of the motion imparted to the control lever at the side of the car. As shown, there are two short helical slots cut in the cylindrical surface of the ring C. Into these slots fit two rollers carried on spindles which are integral with screw plugs inserted in the sides of the case.

The action upon engagement is now obvious. The bronze discs, A and B, revolve in opposite directions when the engine is running idle, as indicated by the arrows in the detail sketch. If now the ring C is rotated by its linkage in a downward direction, the same as that of the disc A, it will move toward the left at the same time and, as the motion is continued, will engage the disc A and finally force it into engagement with the stationary surface X of the housing. If it is rotated in the opposite direction, disc B will be engaged and finally held stationary. In operation of the car, it is usual to fully engage these clutches at once by means of the side lever; but since the case is filled with oil and the rotation of the bronze discs fills the spaces between the engaging surfaces with oil, due to centrifugal action upon the oil, the engagement is not nor cannot be made harsh. When the lever is thrown to its extreme low speed position, there is no sharp engagement felt, but in its stead the car starts softly and gradually but firmly accelerates as the oil is squeezed out by the wedging action of the disc and floating ring until the disc is held stationary, when the engine drives positively. It is probably needless to say that the heavier the load the stronger and more positive will be the engagement and that these parts need no adjustment for wear.

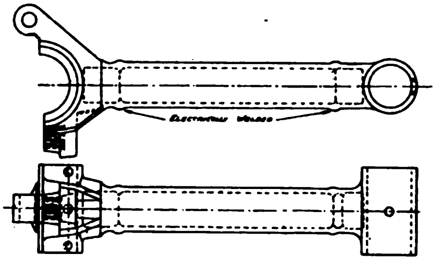

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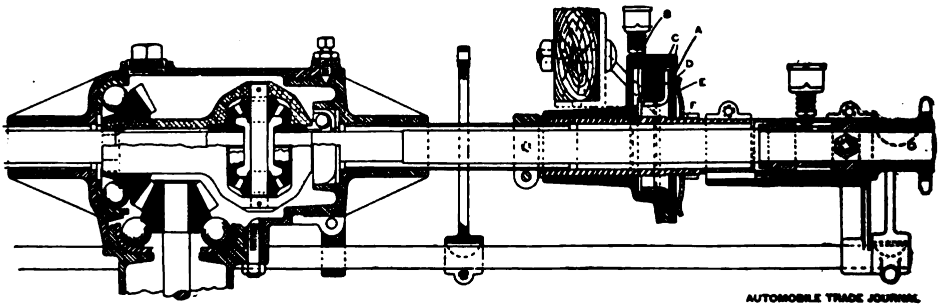
Fig. 7. Views of the electrically welded connecting rod of the Brush Runabout. This rod is fitted with a hinged cap at the lower end and is made of three forgings electrically welded into a unit. The big end bearing is fitted with swedged babbitt.

The high speed clutch which binds the whole gear into a single freely rotating unit is of the multiple disc type, employing four driving discs of hardened steel and three driven discs of phosphor bronze. The sliding carrier of the driving discs is also helically slotted and the same rotating-end-motion-wedging action is here utilized to secure gradual engagement with the same heavy load characteristics as those mentioned for the low and reverse clutch action. The high speed clutch is operated in the same way as the other two, i. e., placed fully in by the side lever, easy engagement and gentle but positive acceleration of the car being attained automatically. There is one feature of the change gear control found in these cars which is possible of simple attainment only through the employment of some such clutch design as above described: the interlocking linkage between the brake pedal and the high gear controlling mechanism so that when it is desired to stop the car, momentarily slow down or disengage the engine, one need not handle the side lever at all, but simply presses upon the brake pedal to secure the above actions. If a slow down under the brake or a disengagement of the engine is desired, as in traffic, the clutch takes hold again automatically upon the release of the pedal, just as in a car with sliding change gear. This is a very valuable feature and adds much to the comfort of the operator, as all know who have handled cars with sliding gears and have afterward been called upon to operate the conventional planetary. Another considerable advantage found in this change gear is that all speeds lock themselves in engagement automatically and it is therefore unnecessary to maintain a continued pressure with hand or foot, as when ascending grades.

### DISTINCTIVE CONNECTING ROD.

Recognizing the importance, referred to engine balance, of employing reciprocating parts of the least possible weight consistent with sufficient strength, an extremely light connecting rod is here used. The rod proper consists of two steel drop forgings and a section of seamless steel tubing, the three parts being electrically welded at the points shown in the drawing herewith. This construction is not the cheapest that could be used, but it has given absolute satisfaction from all viewpoints and failures are unknown. The lower or big end is hinged for simplicity in adjusting and assembling, is lined with nickle babbit and provides a bearing 2 inches by 1⅝ inches. The upper end is non-adjustable bronze bushed and provides a bearing 2 by 25-32 inches. The lower end of the rod is reached for adjustment through the large hand hole shown in the elevation of the engine.



AUTOMOBILE TRADE JOURNAL.

Fig. 8. Brush Runabout jack shaft and differential assembly, showing large ball bearings and their adjustment, semi-floating sprocket shafts, and the details of the rear shock-absorbing radius rod attachment to the frame.

### VALVE MECHANISM.

The cams and cam followers are housed in a chamber integral with the forward crank journal plate, as before mentioned. The timing pinion is integral with the crank shaft and meshes with a cast iron gear wheel which is keyed, pressed and riveted to the end of the cam shaft. One peculiar feature of these parts of the engine is that no bushings are provided for either the cam shaft or the cam followers. These parts are hardened and bear directly upon the metal (cast iron) of the forward journal plate. Such combinations for authomobile journals are rare, but the fact remains that hardened steel shafts running in cast iron boxes have been employed for many years in other services and that several automobile builders are only now becoming aware of the manufacturing and long life advantages to be had through their use.

The cam follower construction is very interesting. These, instead of being yoke ended as in average practice, are straight rods with integral disc heads, which contact the lower ends of the valve stems, threaded in the center and provided with bearing surfaces at each end. This is all clearly shown in the crank case section. Upon the threaded portions are screwed and clamped forged pieces which carry at their outer ends the follower rollers and their studs. The front of the cam chamber has a removable cover held in place by dowels and two long diagonally placed bolts as shown. Upon removal of this cover, the entire mechanism is exposed. Reference to the crank case section and to the section through the mechanism on the line A-B, there indicated, makes clear the manner of assembling and the extreme ease of adjustment, removal or replacement of these parts. It will be noted that the crank case end plate and the cam chamber cover have milled upon their inner faces the flats X and Y. The threaded cam follower stems are free to turn in their bearings, and in assembling are introduced from above and screwed into the forged roller carriers which are introduced through the opening left by the removal of the cover plate. The roller studs are riveted into the forged pieces and the rollers simply slipped into place after the other parts are in position. Each of the roller carriers has a flat which bears against one or other of the flats X, Y and when the parts are all in place the clamping screws tightened, and the cover on, it is impossible for the followers to turn. Clearance between the followers and valve stems is adjusted by loosening the clamp screws and turning the follower stems either up or down until the clearance is right. Long life for the follower bearings is secured through their ample size and the fact that the bearing is on each side of the cam and thus avoids cramping and uneven wear. The two cams are made in one piece and secured to the shaft by a large tapered pin.

### ENGINE ACCESSORIES.

Charge ignition is had from a high tension coil mounted on the dash. The circuit breaker or timer is of the wipe contact type and is mounted on the forward end of the cam shaft and fully enclosed.

### GASOLINE PUMPED TO ENGINE.

A cylindrical oil tank is mounted on the dash and feeds to the engine crank case through a sight feed oil being lifted and forced through by exhaust gas pressure which is proportional to the engine load and therefore never feeds more than is needed.

The fuel system remains the same as used formerly, but because of its originality and simplicity will be again briefly described: Under the right floor boards of the car is suspended a cylindrical gasoline tank from which there are two pipe leads. One of these extends to the bottom of the tank and communicates with the intake check valve of a diaphragm pump. The pump consists of a simple diaphragm mounted centrally within a circular chamber of small depth. One side of the diaphragm is acted upon by cylinder gas pressure through a small passage communicating with the cylinder bore and uncovered by the piston toward the end of its stroke; and the chamber on the other side connects, through the above mentioned valve and pipe, with the fuel tank. As the piston travels up and down in the cylinder it periodically uncovers the port communicating with the lower diaphragm chamber and thus causes the diaphragm to pulsate and therefore pump fuel from the tank. After entering the pump, the fuel leaves through a second check valve and is forced into a constant level chamber, of the over flow type, from which all surplus fuel drains back into the tank through the second pipe lead mentioned above. This constant level chamber takes the place in the carbureting system of the usual float chamber. The constant level chamber, conventional mixing device and throttle valve are located slightly above the cylinder valve port and to the front of the engine where they are out of the way of all parts which it might be desirable to reach for adjustment or inspection.

The carburetor and exhaust pipe are retained in place on the motor by a single stud and yoke, and the muffler is located under the floor boards on the side of the car opposite the fuel tank. The whole engine lay out has been made with a view to great accessibility, ease of inspection, reliability and simplicity.

All gear, sleeve and spindle bearings are of bronze and are automatically lubricated by the oil contained in the case.

The rear transmission member of the change gear is made up of a shaft, bevel driving pinion and a large internal gear, keyed, riveted and pinned to form a unit. This secondary shaft is reduced in diameter at its forward end and enters a bushing carried by the rear end of the primary shaft. The secondary shaft is carried in two ball sets, 4 inches in diameter with 1 inch balls at the bevel pinnion and 3¼ inches in diameter with ½ inch balls at the forward end. A threaded bushing held in adjustment by a lock-nutted set screw serves to adjust these two balls races.

### DRIVING AND DIFFERENTIAL GEARS.

The bevel driving pinion and gear have 15 and 24 teeth, respectively, giving a driving ratio of 1.6:1. The differential yoke and driving gear members are carried on ball bearings—⅞ inch balls behind the gear and ½ inch balls behind the differential as shown in Fig. 8. The differential gearing comprises two bevel gears and two bevel pinions mounted on a single spindle and carried by a one-piece yoke shaped carrier to which the driving gear X is attached. The driving jack shafts enter square holes in the bosses of the differential bevel gears and are carried at their outer ends in bronze bushings 3 by 1 inches. Lubrication at these points is by compression grease cups. Inserted into bosses in the ends of the differential housing are steel enclosing tubes which extend to points just beneath the frame side members. These enclosing tubes fit into other steel tubes which are carried in brackets on the sides of the frame and have formed upon them the threads, keyways, etc., which serve to retain all these parts in position.

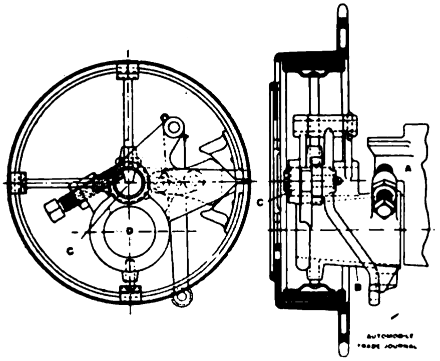


Fig. 9. Brush rear axle end, brake drum and sprocket chain adjuster, brake shoe and bearing mechanism.

This figure also shows the construction adopted for the attachment of the pressed steel shock absorber radius rods for the rear axle. Here A is the forward disc end of the pressed steel radius rod pressed into the shape shown to provide a bearing against the bushing B upon which the chain and brake loads may be taken. C, C are fibre friction discs clamping between them the radius rod end and finding their stationary bearing surfaces against the bracket member, which carries the grease cup for lubricating the friction surfaces, and the stationary disc D, the tension of the star shaped spring E, set up by the nut F, providing the necessary frictional drag between these surfaces.

### GEARING RATIOS.

The jack shafts can be withdrawn from the enclosing tubes upon the removal of the set screws which hold the outboard bronze bushings in place. The driving sprockets, which may be had with either 13 or 16 teeth, are retained by Woodruff keys and pins, and are very readily removed and replaced when it is desired to change the gearing ratio.

From these sprockets the drive is by roller chain to driven sprockets mounted on the rear wheels of either 42, 50 or 58 teeth. The standard gearing with solid tired wheels of 32 inches diameter is the 13 and 50 tooth sprockets, which gives a speed of 19½ miles per hour at an engine speed of 1,500 revolutions per minute. With 28 inch pneumatic tires the standard gearing is either the 16 and 50 tooth sprockets or the 13 and 42 tooth sprockets, either of which gives a car speed of about 25 miles per hour at the above engine speed. For either solid or pneumatic tires, either higher or lower gearing ratios can be had as desired by using different sprocket combinations. However, unless otherwise specified, the above standard gearing ratios will be delivered.

### BRAKE AND REAR HUB CONSTRUCTION.

As stated in the foregoing, the metallic steering yokes and rear wheel bearing spindles together with the brake mechanism are clamped and bolted upon the ends of the wooden axles. The underrunning truss rods are in each case attached to these end fittings and therefore materially assist in binding each into a unit. In both the front and rear, the axle is somewhat lower than the wheel spindle. This eccentricity is utilized in the case of the rear axle to provide a ready means for chain adjustment. The piece A, Fig. 9, is clamped rigidly to the axle end and has the hemi-spherical spring seat formed integrally with it. Over the conical portion of A fits another piece B which has three radial bosses formed upon its hub, the lower boss being the truss rod anchorage and the two upper ones carrying long, lock-nutted set screws, the ends of which engage between them a lug cast with the piece A, as shown in the end view. Because of the eccentricity of the wheel spindle with reference to the center line of the axle proper, wheel center being C and axle center D, it appears that when it is desired to tighten the driving chain, all that is necessary is that the screw to the rear of the lug on A be slackened off while that engaging the forward side of the lug be tightened, each being again securely locked by means of the nuts pro-

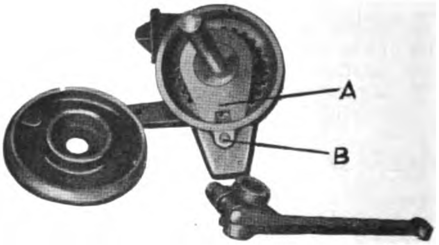


Fig. 10. Brush steering gear made irreversible by an eccentric motion, and consists of a spur and an internal gear.

vided. The piece B supports the brake mechanism and has inserted within it at C the rear wheel spindles.

Retained upon the hubs of the wheels by through bolts in the usual manner, are the integral brake drums and driving sprockets. The brake shoes are formed of heavy spring steel and faced with brake belting. Pressed steel pieces are carried on studs by the piece B to serve as guides for the brake shoes, which are expanded into engagement by the lever operated wedge and link, and which return to the disengaged position upon withdrawal of the wedge by virtue of their spring action, in which position they are supported free of the drums at four points. Links lead forward from the lower ends of the brake levers to the ends of levers carried on the ends of a long brake operating spindle which is mounted as shown in the section of the differential and jackshaft Fig. 8.

### STEERING GEAR AND CONTROL MECHANISM.

The switch in the primary ignition circuit is incorporated with the coil on the dash. In the chassis plan is shown a so-called priming rod, which serves to hold the air valve closed when starting. The crank is automatically held in an upright position when disengaged from the shaft. The steering gear is extremely original and embodies irreversibility with quick action, a three-quarter turn of the hand wheel being all that is required to throw the wheels hard over in either direction, starting from the straight ahead position. Fig. 10 shows the gear with cover plate removed. Upon the lower end of the shaft, to which the steering hand wheel is attached, is formed an eccentric which has a bearing in the center of a boss formed with a simple spur gear on its under side, and a lever on its upper side. This lever A is slotted, as shown, and engages a square block which is pivoted on the pin B. This pin and sliding block engagement with the lever prevents the spur from turning and causes it to oscillate about the pin when the eccentric is shifted by a turning of the hand wheel. Below the lever portion of the spur gear and in mesh with it is an internal gear carried on a spindle which extends through the bottom of the case and has keyed and clamped upon it the steering lever shown. This lever connects by a link across the car with a lever on the steering stub axle of the right forward wheel. Due to the position in which the eccentric sets when the car wheels are in the straight ahead position, and to the constantly changing length of the oscillating lever as the eccentric is turned, the motion imparted to the road wheels is at first slow and then faster, for equal angular displacement of the hand wheel. The eccentric makes this gear reversible.

### THE CONTROL.

In these cars the driver's seat is on the left side. The steering post is inclined and enclosed in a brass tube, which carries at its upper end, and just below the hand wheel, the throttle and spark advance levers, set on opposite sides, which are fitted with knob ends for ready handling.

The change gear lever at the side of the car controls the speed changes and the emergency brake selectively. No gate is fitted, the lever oscillating in a single slotted quadrant and when drawn sidewise serving to shift its spindle longitudinally. With the lever drawn toward the operator, the reverse is had by a forward motion and the low speed ahead by the rearward motion. With the lever pushed outwardly a forward motion gives the high speed ahead and a rearward motion the brake. Interconnected with this lever is the ratchet retained foot brake connected with the rear wheel hub brakes.

The same chassis is used for both the runabout and the light delivery car, with the exception that in the latter the steering gear, foot pedal and side lever are moved up forward as shown in the photo.

The runabout bodies are all ironed for tops and have at the rear of the seat, and extending forward under it, a carrying space of considerable size for so small a vehicle. Instead of placing a deck over the space in the rear of the body, this is covered by a waterproof fabric covering which matches the coloring of the car. This is done so that a considerable degree of flexibility in the size of the carrying space may be had if desired.

The prices quoted above, $500 and $550 with solid and pneumatic tires respectively, does not include tops, lamps or horn. The company furnishes tops at $30, side and tail lamps, as shown in the photo of the runabout, for $15, and large dragon horn, as shown, for $5.

### ON THE ROAD.

Because of the careful balancing of the engine reciprocating parts, the motor runs light with surprisingly little vibration; and when the car is under way none is felt. The writer rode in both a test car and a car ready to be delivered, and in each case the remarkable freedom from vibration and the soft action of the speed clutch engagements was very marked. In running over some of the unpaved streets north of the Detroit Boulevard ample opportunity was found for testing the behavior of the clutches and the flexibility of the engine. After being seated in the car and getting under way, at which time the low speed was used, no running was done on other speeds than high. When running this way the control of the car is exactly similar to that of a car with sliding change gear and master clutch, and at no time was it necessary to make use of the side lever.

The engine showed considerable flexibility, and in each case, after a slow down for traffic or rutty roads, got away again with great celerity and smoothness.

The test car, which was fitted with solid tires, was the one used for the running on rutty and unpaved roadways, and it was very interesting to watch the action of the front helical springs and shock-absorbing radius rods. These were in continuous action, except when on smooth pavement, and their great flexibility and sensitiveness, combined with the radius rod devices, effectually dampened road vibration. In spite of the low gearing of this car it skimmed along at a great rate—as testers always drive. On the one occasion when it was necessary to use them quickly, the brakes showed themselves to be smooth acting and very powerful.

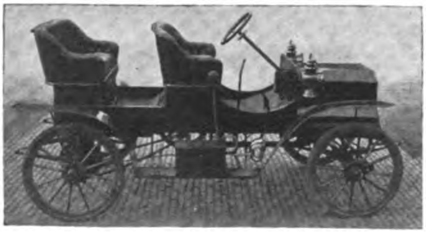
While the writer can give no figures from personal observation of the fuel consumption and running economy of these cars, the authenticated averages of the four runabouts which recently participated in the Brush Reliability run are here given as an indication of average performance.

The averages given below are for four cars; that is, the mileages, fuel consumptions, oil consumptions, repair costs, etc., for all four have been added together and averages struck as if the performance of one car only were being considered:

| | |
|---|---|
| Total mileage for four cars ................ | 6,587.5 |
| Total gal. gasoline, four cars ................ | 292.5 |
| Average miles per gal. gasoline ............ | 22.5 |
| Total oil quarts, four cars ................ | 64 |
| Average miles per qt. oil .................. | 103 |
| Total time in days, four cars ................ | 80 |
| Average miles per day. | 82.3 |
| Total repair cost, four cars ................ | $5.80 |
| Average miles per 1c repair cost .......... | 11.3 |
| Average repair cost per mile ................ | $.000884 or .0884c |

## A BUSINESS SURREY OF SIMPLE CONSTRUCTION

A simple constructed, substantial business man's car, was recently brought out by The Overholt Co., of Galesburg, Ill., makers of the Overholt miter box. It has been the aim of this company in designing the Overholt motor car to produce a machine that would satisfactorily replace the old family horse and buggy as regards simplicity, reliability and price. No radical departures from accepted practice have been attempted and the construction is standard throughout. The wheels, axles, steering apparatus, frame, engine and other main parts are made by the Overholt Company and the accessories used are all of well-known make, including a Buffalo carburetor, Kingston muffler, Essex oiler.



The "Overholt" Air-cooled, Friction Drive Motor Surrey. Price $650. Also furnished as a single seat runabout at $600.

Power is furnished by a 2-cylinder, opposed, air-cooled gasoline motor. Speed changes are obtained by means of friction discs this type of speed change having been adopted because of its simplicity. Drive to rear axle is by a 1-inch pitch Baldwin roller chain. Rockwood friction fiber is used on the friction disc which runs against an aluminum disc the thrust of which is taken by a spring, insuring equal pressure. The thrust is carried by ball bearings to reduce friction.

The motor cylinders are 4⅛x4 inches and develop 12 to 14 horse power. The motor is placed in front under the hood and its flywheel is cast in fan form to aid in cooling the cylinders. Ignition is by jump spark, dry cells furnishing the current. An oil pool is maintained in the crank case for splash lubrication and a force feed lubricator supplies the cylinders and main bearings.

The tubular front axle is fitted with drop forged steering knuckles and arms. The steering gear is of the spur gear and segment type and is very simple.

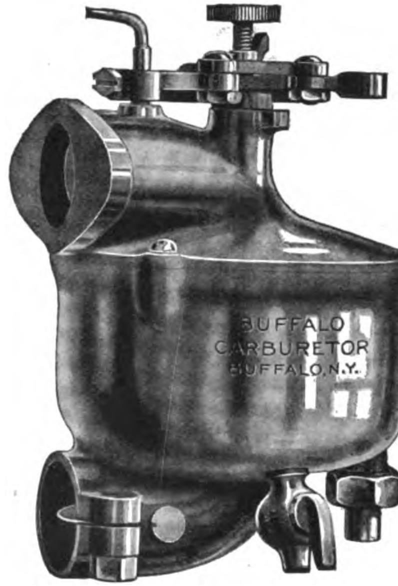
The wheel base is 86 inches and the gauge 56 inches. The wheels are of the artillery type the front wheels being ball bearing. Solid, 1½-inch Firestone, side wire tires are regularly fitted. Pneumatic tires will be furnished on special order at extra cost. Four full elliptic springs carry the body. The rear seat is removable and without it the car is adaptable to light delivery purposes. The body is 75 inches long, allowing ample room for passengers when both seats are used or for baggage or merchandise when only one seat is used.

As a surrey this machine is sold for $650 and as a runabout for $600. It was not the designer's attention to produce a speed car but the machine shows up satisfactory in this respect being capable of doing 30 miles per hour. The demonstrating car has been run about 4,000 miles during the past summer in ordinary business use during the day and for pleasure riding at night and on Sundays. It has hauled loads as heavy as 600 lbs.

# THEORETICALLY CORRECT AND PRACTICALLY PERFECT

# THE BUFFALO

## Mechanically Operated Carburetor

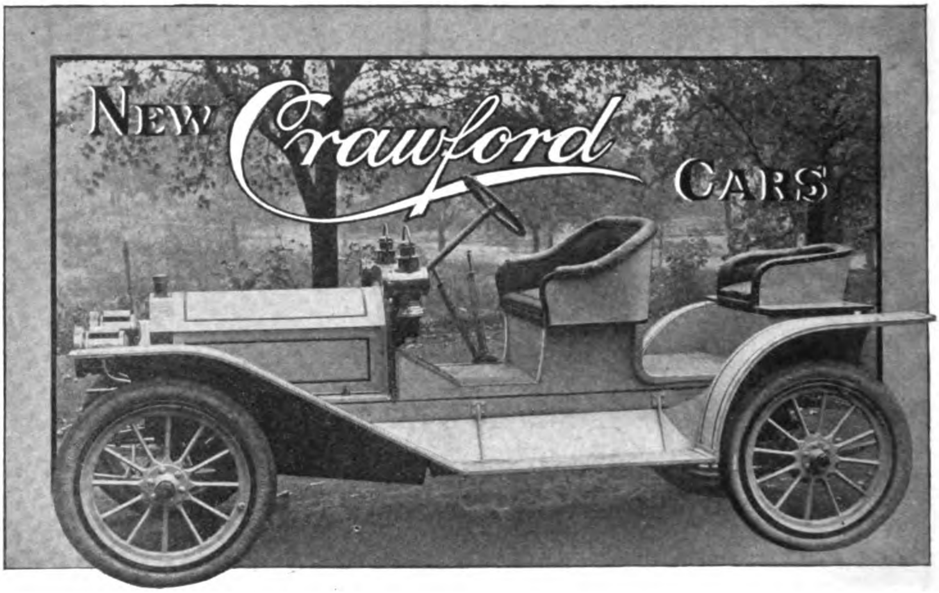


It is the greatest carburetor on the market for simplicity, power, vim and speed, and is not affected by change of atmospheric conditions. It is an absolutely mechanically operated carburetor and the only one of this class in America. It has no spring poppets or air valves to get out of order, and when adjustment is once made it is permanent. It has a very wide range and is extremely flexible and changes of atmosphere do not affect the mixture.

Its construction is such that it does not choke or get sluggish. The cone valve and throttle are link connected and when once adjusted are actuated in unison by one lever. Made in quarter sizes, ranging from ¾ in. to 2 in.

Correspondence solicited from automobile manufacturers, dealers and owners.

**BUFFALO CARBURETOR COMPANY**
**887 Main Street, Buffalo, N. Y.**



As usual, the Crawford Automobile Company, Hagerstown, Md., offers for the season of 1909 a complete line of gasoline cars, ranging from an entirely new $1,250, 4-cylinder, shaft-driven runabout up to a large 50 H. P. side chain driven 7-passenger car. For several seasons the Crawford cars were driven by means of a side chain to each of the rear wheels, but for 1908 two entirely new high-power, shaft-driven models were added; and for this season, in addition to these models, a new small shaft-driven car, known as Model H, is being placed on the market. This new model has a 4-cylinder, 25 H. P. motor, and is fitted with either a single or double rumble seat, or with a baby tonneau, which will comfortably seat three, making the seating capacity of this little car five.

The former models that is, Model G and Model D, have been carried over for this year with a few minor detail changes. Model G is a 40 H. P. touring car with seating capacity for five. This car is shaft-driven and sells for $2,000 as a touring car, $3,750 as a landaulet, or both bodies can be had for $4,000. Model D has practically the same power plant and general chassis specifications, but being a runabout the seat is placed further back, steering post given greater rake, and a single or double rumble or a baby tonneau can be had at the same price as the Model G—$3,000. If two bodies are ordered an additional price is charged. The remaining car is Model F, a large 50 H. P. double side chain, seven-passenger machine, which has been but very slightly modified during the last three seasons.

### MODEL G CHANGES

The general specifications of Model G are 4 cylinders, water cooled, 5 x 5, 40 H. P. Crawford motor, force feed lubricator, double ignition system using magneto, multiple disc clutch, sliding gear selective type change speed mechanism, giving 4 speeds forward and 1 reverse, direct on the third speed. The gears are nickel steel and mounted on ball bearings. The car is shaft-driven, has 114 in. wheel base and is fitted with Goodyear quick detachable rims. The change speed gear lever operates on the selective principle, the concentric tube, which has a transverse motion giving gear selection, is mounted on steel balls which operate in longitudinal slots milled into the tube. This special mechanism, which was completely described in the February, 1908, issue of the Trade Journal, page 89, has been found to work perfectly and is fitted without change. The straight line type of body has been increased in length about six inches, giving more leg room. The springs remain the same, both being of semi-elliptic type, but the driving force of the rear wheels is now through strut rods from the ends of the rear axle, their forward ends being ball and socket supported on the brake rod hangers. Both ends of the spring are now shackled and are free to move, as they do not transmit any of the driving force of the wheels to the frame. Thirty-four inch wheels with 4 in. tires are used, as on last season's model. The cowled or hooded dash has been supplanted by a plain brass-edged dash, this being more in keeping with the straight line type of body. The forward time gear case has been redesigned and somewhat improved, so that dripping of oil is impossible. The lower half of the case is now integral with the lower part of the crank case. A slight modification has also been made in the construction of the valve lifting rods, the lower ends of which are fitted with hardened steel rollers. The portion of these lifting rods which bear most heavily against the guides has been fitted with bushings to take the wear due to the side thrust of the cams. This bushing is in the form of a cylindrical sleeve enclosing the roller, with the exception of the lower portion, which bears on the cam. These detail changes, with the exception of the tires, apply also to the Model D runabout.

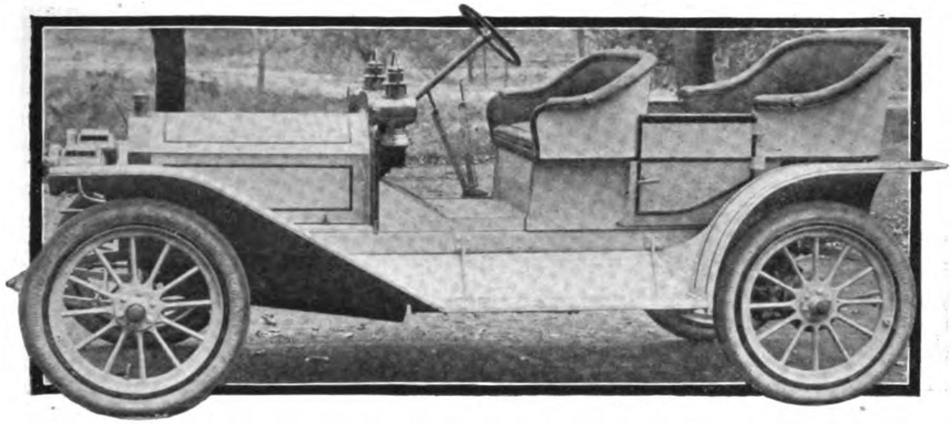


Fig. 1. Crawford 1909 Model H Light Touring Car and Roadster, 4 cylinder, 4 x 4, water cooled, 25 H. P. motor, double ignition, cone clutch, selective type sliding gear, transmission rear axle, one universal joint, propeller shaft housing, acting as torque rod. Transmission and full floating type rear axle, mounted on ball bearings. Tires 32 x 3½. Double brakes on rear hubs. Price as a 5-passenger touring car, $1,300; as a runabout with single rumble seat, $1250; wheel-base 104 inches; tread 54 inches; weight 1900 lbs.

The Model F, which is the largest of the cars, having a 5 x 5½, 50 H. P., 4-cylinder, water-cooled motor, is the only chain-driven model now manufactured by this company. This car has been so satisfactory that it will be continued without change for 1909. It is fitted with double ignition, force feed lubrication, multiple disc clutch, sliding gear which is of selective type, giving three speeds forward and one reverse, double side chain drive 34 x 4 in. front and 34 x 4½ in. rear tires, with Goodyear quick detachable rims. The wheel base is 118 in. and the tread 56 in. The price of this seven-passenger model with touring body, is $3,250, as a limousine $4,250, or $4,500 with both bodies.

### THE NEW MODEL H

This car is an entirely new design for this season, and has been laid out to meet the requirements of the large number of car purchasers who wish a high grade machine of standard design, sufficient horsepower, light weight with accompanying low upkeep, and yet at a moderate price. The 4-cylinder, water-cooled, 1909 Rutenber motor has been adopted, the performance of which is well known to be entirely satisfactory. The cylinders are 4 x 4, rated as 25 H. P. The motor cylinders are cast separately, but with flattened water jackets on cylinder adjacent sides and valves in integral chambers on one side making a very compact engine.

The special lubricating system consists of an oil reservoir at the bottom of the engine crank case, a gear pump at the lower forward end of the engine case and leads to the top of the main bearings. The oil pump is driven by a vertical shaft, which derives its motion from bevel gears from the engine shaft, and the oil is taken from the sump and forced through copper tubes to the upper side of each of the main bearings, where it is received in shallow oil pockets. Felt filled leads from these pockets convey the oil to the surface of the bearing. These leads being filled with felt prevent any grit from reaching the bearing surface. A constant level for splash is maintained in the case by means of suitable overflows, the oil passing through strainers into the oil well at the bottom, in which at the forward end a glass sight gauge is installed.

Connecting rod big end and main bearings are made accessible by a large hand hole plate on each side of the case. The engine is supported on an angle steel subframe by four integral aluminum crank case arms. This sub-frame, which is 2 x 1½ in. section, is carried back and supports the transverse brake rod and concentric tube arms, from the ends of which arms connect directly with rods operating the brakes. None of these rods extend outside of the chassis frame. The inlet and exhaust manifolds are each held by yokes and nuts, and can be quickly removed.

A 15¾-in. diameter leather-faced cone clutch is arranged in the fly-wheel, and is controlled by the left foot lever. This clutch, as usual, is forced into engagement by a coiled spring, and its translatory motion is allowed for by milling into the rear of its hub four large radial slots into which the ends of the first member of a universal joint are sliding fits. This allows the clutch hub to be moved forward or back, but still it must transmit its radiation to the universal joint at its rear end. The rear member of this universal joint is a yoke keyed to the forward end of the propeller shaft, which shaft has a bearing in the Y-shaped bronze casting, the ends of which casting are trunnion supported in fixtures on the subframe. This Y-shaped piece also has attached to it the forward ends of the propeller shaft housing, only one universal joint being used, and the housing acting as a torsion arm. This construction is clearly shown in the plan view of the chassis. At the rear the propeller tube fits into the forward end of a cast malleable iron rear axle change speed gear case, which is integral with the rear differential and axle housing, the whole forming a very compact rear axle construction. The change speed gear provides three speeds forward and a reverse, and is selectively operated by a special Crawford mechanism, which will be described under the gear shifting mechanism. This change speed has the two shafts arranged over each other, with the counter shaft at the bottom. There are two shifting gears. By moving one forward the high speed is obtained by means of a six-lugged clutch, giving a positive lock, a slight backward motion of this gear gives intermediate, and the other sliding gear gives the low speed and reverse. The gears are 6-8 pitch—that is, the width of the tooth is what it should be for six pitch, and the depth of the tooth is made to correspond to that of an 8-pitch gear, giving less depth; or, in other words, a stockier tooth, which is very strong. Special Carpenter nickel steel, case hardened, then heated and oil dipped; then again heated to a predetermined temperature in an oil bath, is the method employed in finishing these gears. The last heating gives all the gears a uniform hardness. This method has been employed for change gear finishing during the previous season, and has given entire satisfaction. Both shafts are mounted on adjustable ball bearings. The forward end of the counter shaft rests in a ball bearing, the cone of which is castellated, so that when screwed up to the proper position it can be locked. This also draws the rear bearing up to position. The front end of the gear case is applied by seven cap screws. Into this piece the rear end of the propeller shaft housing is forced and held by four cap screws threaded through the case and into the tube Two of these cap screws also hold the ends of diagonal brace rods, which run to the outer ends of the rear axle tube and are securely fastened to the brake rod supports. The driving bevel pinion is supported directly on ⅝-in. balls and at the forward end a double circle of ⅜-in. balls is used, while ½-in. balls are used on the counter-shaft bearings. The differential, which is of the bevel pinion type, is mounted on ⅝-in. ball bearings, the ball cups being pressed into the malleable iron case.

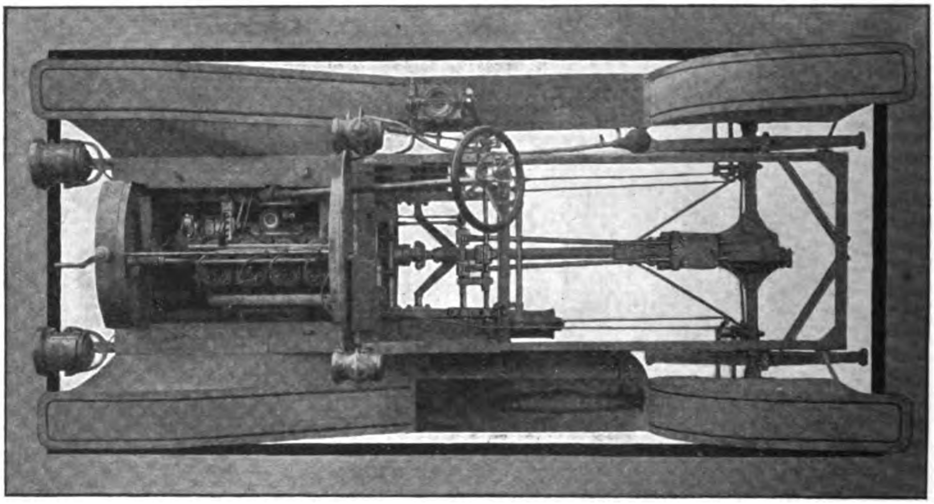


Fig. 2. Plan of the chassis of the new Model H Crawford. This view shows the compact 4-cylinder motor, location of magneto, the new selective gear shifting mechanism, as described in the text, and the sliding gear three speed and reverse transmission rear axle. Also the Y-shaped piece, with trunioned ends which support the forward end of the propeller shaft housing, which is the torsion arm and takes the driving effort of the wheels.

### BALL BEARING FLOATING AXLE

The rear axle is of the floating type, the inner ends of the live shafts being Woodruf, keyed to the bevel gears of the differential, while the outer ends drive the wheel hubs by means of four lugs on a ring which fits over the square end of the shaft. The wheels are mounted on ball bearings, which run on the outside of the axle housing, so that the shafts carry no weight of the car, but simply transmit rotation to the wheels. The axle tubes are pressed, riveted and keyed into the malleable differential housing. The front wheels are also on ball bearings.

Wheels are 32 inches wide with 3½-in. tires. The front axle is of tubular pattern, but is reinforced on the inside by a ½-in. vertical web, which is placed in the tube while straight and bent with it to the axle form. The front springs are semi-elliptical, 42 in. long, 1¾ in. wide, and have six leaves, banded at points about two-thirds the distance from the centre, and are perched on top of the axle on spring seats, which are brazed in place. The rear full elliptic springs are perched on the under side of the rear axle tube, the spring seats being swivel mounted.

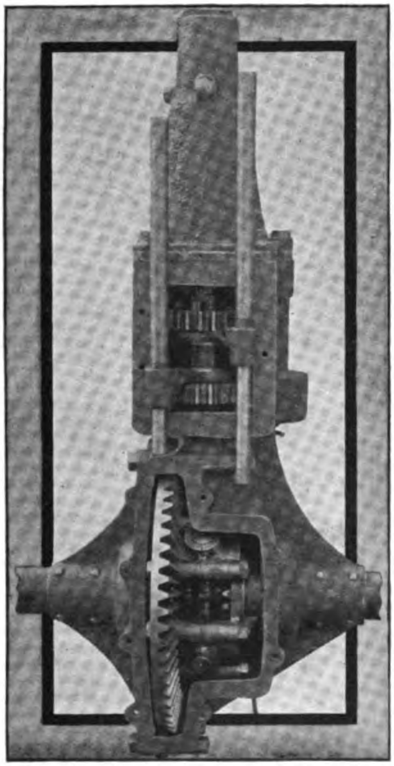


Fig. 3. Closer view of the very compact Crawford transmission rear axle unit. The gear shifting rods controlling the speeds are clearly shown, and also the bevel gear differential and large driving bevel, the top of the transmission case being removed. This entire mechanism runs on ball bearings. Details described in the text.

The steering gear is of the bevel gear and pinioned type, has practically no back lash, and it is said by the makers, has given perfect satisfaction in the hands of users. The cross link is at the rear of the front axle and is raised above the axle, so that it is protected. There is nothing whatever below the axle to be struck by road obstructions.

The frame is the usual pressed steel construction, ⅛ x 1½ x 3½ in. depth with straight sills. The cross members are both angle steel and pressed steel. The front cross member is angle steel bent to fit the bottom of the vertical flanged tube rotator, forming a hammock support. The rear cross member is pressed steel with gusset plates and reinforced by diagonal angle steel braces. The middle cross member is of angle steel and supports the rear end of the sub-frame.

A float feed carburetor arranged for automatic compensation is used, gasoline fed to it by gravity from a 10-gallon heavy tin tank placed under the front seats. Heavy block tin is used in preference to copper and has been found to give better satisfaction. A double system of ignition is used with magneto and distributor, dry cells being used for starting. A single set of plugs, and a non-vibrating single coil are employed, making a simple ignition system.

### CONTROL

The usual spark and throttle lever control are supplied on the hand wheel, the left pedal controls the clutch, and the right operates the outside contracting service brake, the drum of which is 16 in. in diameter. The outside hand lever controls the inside expanding camel's hair belt lined brake. The brake pull rods are entirely inside of the chassis frame and connect with short shafts parallel to the rear axle and mounted on it, which by means of toggle joints or cams, operate the brake bands. The brakes are fitted with a dust-tight shield, the external brake being used as the service, and the inside as the emergency brake, as the latter is protected, and should be in shape for quick action. The body is of wood, with the exception of the seat forms, which are of metal. Tufted upholstery is used on the touring model and plain on the runabout. All bodies are ironed for tops.

### THE GEAR SHIFTING MECHANISM

An entirely new and original method of selective gear shifting is used on this new car. This mechanism is shown in the plan view of the chassis. There are two sliding gear members in the rear axle transmission, each controlled by a rod sliding through the top of the case in a longitudinal position, the correct position for each speed being retained by spring pressed balls engaging sockets in rods. The forward ends of these rods are connected to a cross shaft under the footboards. The outside hand lever can be moved transversely, and also forward or backward. When moved toward the driver it slides a shifting gear sector into such a position that it meshes with another gear sector on the shaft previously mentioned to which the control rods are connected. With the lever in this position a reverse motion gives the reverse speed, while a forward motion gives the low speed ahead. If now the gear shifting lever is moved outward, its sliding gear sector meshes with another gear sector to control the rod operating the intermediate and high speed; the backward motion of the lever giving the intermediate, and the forward motion giving the direct drive on the high speed. A U-shaped bolt is so arranged and controlled by the motion of the sliding gear sector that when one speed is in the others are locked and cannot be moved.

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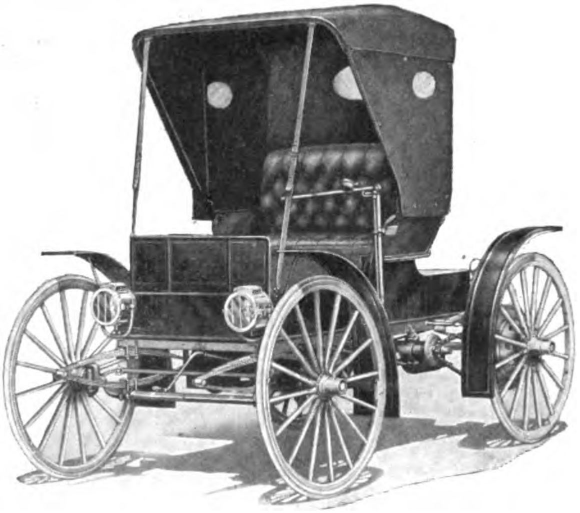
## A $370 MAIL ORDER MOTOR BUGGY

Sears, Roebuck & Co., of Chicago, Ill., one of the largest mail order houses in the country, have lately taken up the sale of automobiles and are offering a 10-12 H. P. motor buggy at $370, or $395 with top and fenders. The price in each case includes 3 lamps. From the cuts herewith it will be noted that the machine is a neat, trim looking rig and materials and constructive features are claimed to be thoroughly reliable and satisfactory. Sears, Roebuck & Co. claim to manufacture these machines and as they sell direct to users, all intermediate handlers' commissions are eliminated and selling price is kept at a minimum. These cars are sold by mail, cash must accompany order, and customer pays the freight. The shipping weight including crate, etc., is 1,200 lbs.

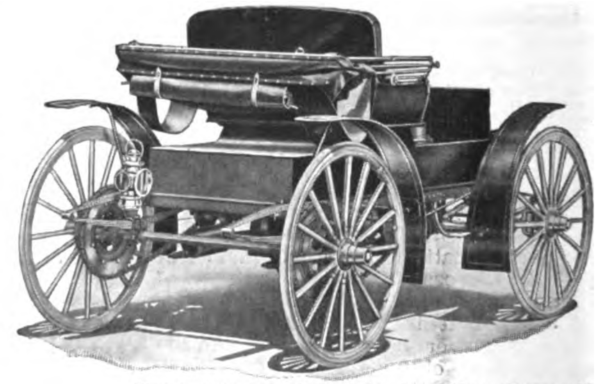


Three-quarter front view of the Sears Motor Buggy with top up. Price $395, with top and fenders; $370 without. Prices include lamps.

The motor is a 2-cylinder, opposed, air-cooled gasoline engine of 4 1-16 inch bore and 4-inch stroke. The crank shaft is a nickel steel forging of 1⅝-inch diameter. A friction transmission is used and drive is by side chains from the ends of the countershaft, Diamond chains being used. An internal, expanding brake acts on each rear wheel and may be locked in position when the car is left unattended. The wheels are 36 inches in diameter and are shod with 1⅜-inch Diamond solid tires held in electrically welded channel rims. Timken roller bearing axles are used, 1⅛ inches square, drop forged steering knuckles being used in front. The frame is of angle steel 2x1½x3-16-inch. It is carried on 4 full elliptic springs 36 inches long.

The body is securely bolted to the angle steel frame but can be easily removed without disturbing any of the power plant parts. It is of the piano box type and measures 30 inches wide by 67 inches long. The rear portion is covered by a wood deck boot under which and under the seat there is a space 29x21 inches for carrying luggage. The fuel tank, ignition battery and spark coil are fastened to the body under the seat. The seat is 37 inches wide and is well upholstered all over including the ends in heavy "Morrocoline" imitation leather. The seat cushion is removable.

The top is a 3-bow skeleton job made of a heavy grade moroccoline with side and back curtains. When up it is held by two straps running from the front bow to the dash. The weight of the machine is 1,000 lbs. The road clearance is 13 inches; wheel base 72 inches; gauge 56 inches. The gasoline tank holds six gallons, enough for 150 miles' running.



Three-quarter rear view of the Sears Motor Buggy with top down.

# VICTORY at SAVANNAH

FOR

# Truffault-Hartford Shock Absorber

¶ Wagner wins Grand Prize using Truffault-Hartford Shock Absorbers. His Fiat car, Truffault-Hartford equipped, finished first, covering the

***402 Miles at the rate of 65.5 Miles an Hour***

A NEW AMERICAN RECORD FOR ROAD RACING

¶ Wagner, among the most successful professional drivers of the world, never drives without Truffault-Hartfords on his car.

¶ *The Lancia Car* driven by Hilliard and equipped with the Truffault-Hartford Shock Absorbers won the International Light Car Race at Savannah—196 miles in 3 hours, 43 minutes and 33 seconds, at the rate of 52.6 miles per hour.

¶ The extraordinary speed maintained in both races was made possible by the use of the Truffault-Hartford Shock Absorbers, which absorbed all vibration, jolt and jar and minimized the wear and tear on the tires. Any automobile, whether it be a racer, touring car, a roadster or a runabout, can be made smoother running, more comfortable by the use of the Truffault-Hartford Shock Absorbers.

***Made in Three Sizes***

| | |
|---|---|
| **Standard** for cars over 1800 pounds (per set of four) . . . . . . . . | $60.00 |
| **Intermediate** for cars from 1200-1800 pounds (per set of four) . . . | 40.00 |
| **Junior** for smaller cars and runabouts weighing up to 1200 pounds . . | 25.00 |

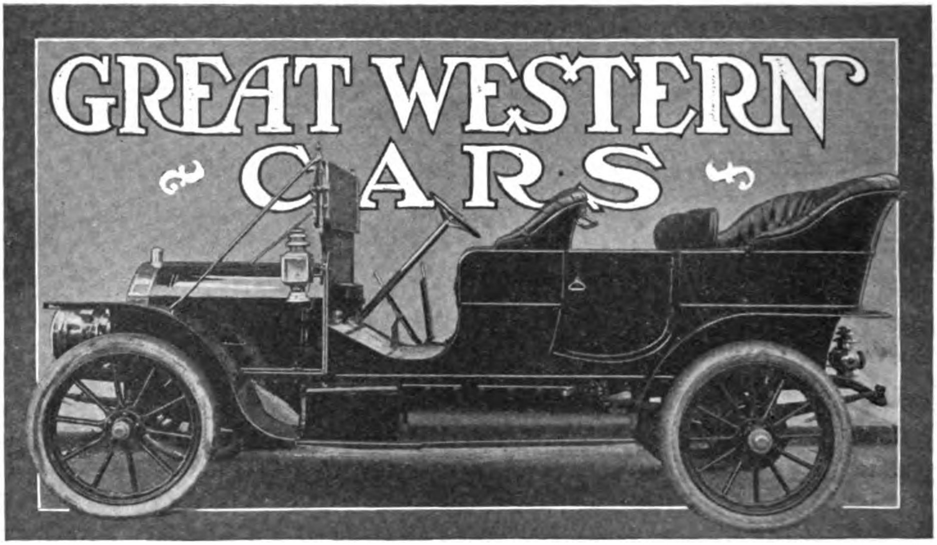
***Complete Fittings Furnished Without Extra Cost***

***Mention Make, Model and Year of Car When Ordering***

# Hartford Suspension Company

143 Bay Street :: :: :: Jersey City, New Jersey

***BRANCHES: New York, 212-214 West 88th Street. Boston, 319 Columbus Avenue***



Three lines of Great Western cars are being manufactured by the Model Automobile Company of Peru, Indiana, for the season of 1909. These Models are styled Model 20, 21 and 22. Model 20 is rated at 30 horse power. Model 21 at 40 horse power and 22 at 50 horse power. Each model is an exact reproduction of the 50 horse power 7-passenger car this company has been building for the last three years, the only difference being size and horse power.

The mechanical construction being alike in all, with the exception of size, but one description is required. Semi-elliptic springs are used on the 7-passenger car and full elliptic on the rear and semi-elliptic in front of No. 20 and No. 21. These several models are made in either Touring car or Runabout styles with double and single interchangeable rumble seat. No. 20 and 21 can be had in the convertible type from tourer to runabout at the same price.

This company builds a 500 horse power 4-cylinder stationary engine, which is exactly like the 30 horse power automobile engine or motor. Fifteen years have been spent in building this style of motor, and automobiles have been built by them for the last six years. The largest 4-cylinder motor is 17 inch bore and 30 inch stroke, always along the same line of construction. No radical changes have ever been made during this time, simply refinements.

The 7-passenger 50 horse power car's weight per horse power is only 58 2-5 lbs., the 30 horse power and 40 horse power 62½ lbs.

The 4-cylinder motors have remained practically unchanged from last season and were described in the Journal, May, 1908, page 80.

The cylinder dimensions are No. 20, 4 inch bore, 5 inch stroke. No. 21, 4½ inch bore, 5½ inch stroke. No. 22, 5 inch bore, 5½ inch stroke. The cylinders are cast separately and machined inside to obtain uniform compression, are reamed and ground to size, water jackets are large and spacious being larger at the top where the heat is most intense, giving great cooling effect. The pistons are roughed inside and out and then annealed before they are ground, this giving them an equal expansion when finally fitted and permitting a much closer fit than can be obtained otherwise without sticking when hot. After being fitted with this process it is claimed to be possible to remove all piston rings without making any perceptible change in the running of the motor.

The exhaust valve is located in the head and is completely surrounded by water. This arrangement preserves compression as there is less tendency for valve seats to pit or warp. The intake valve is at the side and as close to the cylinder as possible for the purpose of leaving practically the entire clearance in the cylinder. The exhaust has ½ inch stem, the top of which is cupped out to receive a steel ball against which the rocker arm works. This is done for the purpose of eliminating noise and to guard side-wearing of the valve stem and practically overcoming any wear endwise. The adjustable valve lifters for the intake valve are also equipped with ball ends for the same purpose as the exhaust.

The cylinders are offset from center of crank shaft ½ inch.

The crank case is aluminum in two pieces with spacious hand-holes for connecting rod inspection and adjustment, and has five bearings for the crank shaft. The crank case proper does not take any of the strain of the power strokes of the

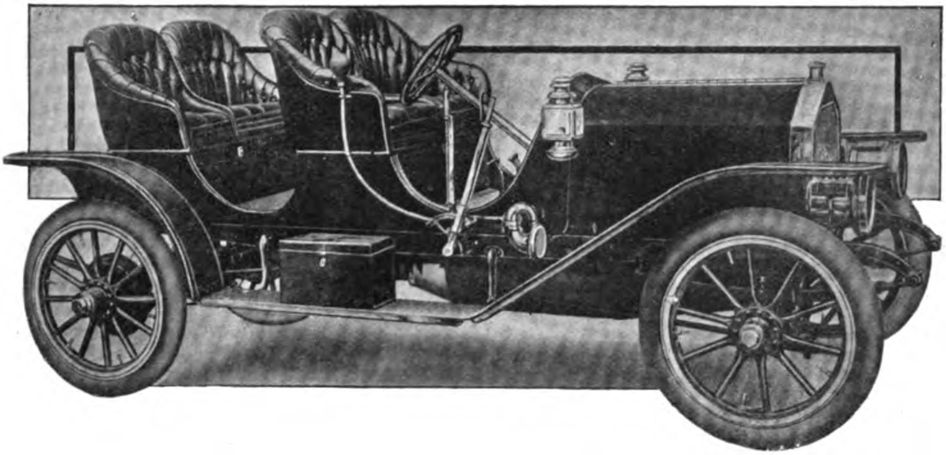


Fig. 1—Model 20 Great Western, 30 H. P. car, fitted with double, high-backed rumble seats. This car is furnished also with touring body and can be converted from one to the other.

piston, instead the studs which hold the cylinders to the crank case go clear through and hold the Manganese Bronze bearing caps of the crank shaft, thereby bearing the whole load or strain where it belongs and not on the aluminum threads as in most other motors. The bottom half can be quickly removed without interfering with any bearing.

Nickel babbitt die cast bearings are used on all main and connecting rod bearings. The five main bearings are exceptionally long with the bearings fitted into Manganese bearing caps.

The crank shaft is a solid one-piece drop forging, heat treated and ground to size, carefully balanced alone and with flywheel assembled.

All valves are operated by a single cam shaft. The gears for cam shaft, pump and magneto drive are enclosed in a separate oil pipe case, which is divided in such a way that either the pump or magneto can be removed, independent of each other or the balance of the gears. In fact by removing this case cover and loosening two nuts the whole cam shaft may be removed from the front for repairs and inspection without interference with any of the other parts of the motor.

Spiral gears are used on the crank shaft and cam shaft eliminating noise.

A gear pump is used with flat tube radiator of ample size to insure proper cooling under the most trying conditions of service, and a fan is mounted on an adjustable bracket and is driven by a 1 inch belt at 3⅓ times the engine speed.

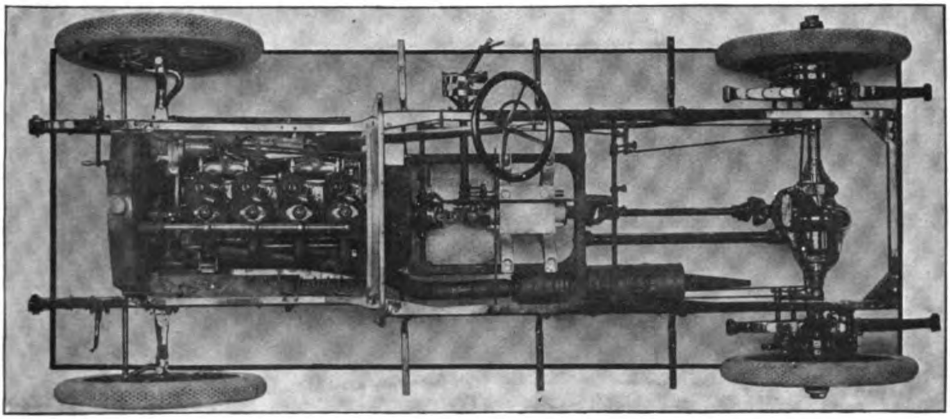


Fig. 2—Plan view of the chassis of Great Western Model No. 21, 40 H. P., four-cylinder motor, 4⅛ bore by 5½ stroke. Wheel base 114 inches, semi-elliptic, front springs 2 x 40 inches, full elliptic 1¾ inches by 40, selective sliding change speed gear, magneto ignition. Note the exhaust valve arranged in the head, and double universal and slip joint between the engine and change speed gear.

Ignition is by high tension magneto and battery, each system being independent of the other. The magneto is located on the right forward supporting arm of the crank case just ahead of the carburetor.

The gasoline passes by gravity to a Schebler Type-F automatic water-jacketted carburetor located at the center of the motor on the right hand side just below the inlet valve chambers.

The exhaust is on the left side of the motor and shows careful designing. The manifold gradually increases in size as each lead enters until at the outlet it is double the first size. All bends in the exhaust pipe are long curves, avoiding any sharp bends anywhere in the exhaust line from the engine to the outlet of the muffler. The latter is a well known tube type and of large proportion, permitting full expansion of the gases and is very quiet.

The oiler with 7 sight feeds is mounted close to the exhaust pipe to keep the oil flowing freely in cold weather and is driven by an eccentric and ratchet, eliminating the troubles of belt driven oilers. The splash system is used in the crank case.

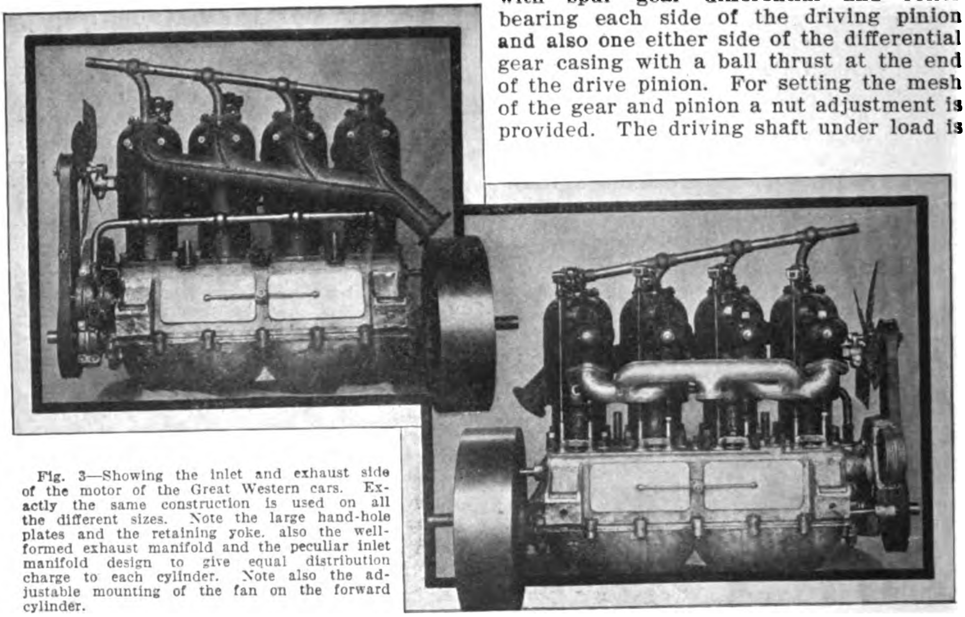


Fig. 3—Showing the inlet and exhaust side of the motor of the Great Western cars. Exactly the same construction is used on all the different sizes. Note the large hand-hole plates and the retaining yoke, also the well-formed exhaust manifold and the peculiar inlet manifold design to give equal distribution charge to each cylinder. Note also the adjustable mounting of the fan on the forward cylinder.

THE CLUTCH

A cone clutch is used with a composition covering with springs under the covering to insure easy engaging. One of the features of the clutch is its manner of releasing, which is through a ball thrust bearing instead of a sliding yoke. This ball thrust collar is of split type making it easy to remove, the thrust plates being hardened and ground. This type of clutch is simple, easily understood and quickly adjusted for wear. The connection between clutch and transmission is a double universal joint with sliding square for clutch release. In fact it is much the same as from the transmission to the rear axle.

Much stress is placed by the makers on the use of this construction as they claim for it all the advantages which are said to be secured in alignment by the use of the unit power plant without any of the disadvantages of inaccessibility attendant upon the use of the housed in unit construction.

The change speed gear is of the selective type sliding gear, three speeds forward and reverse using Timken Roller bearings and nickel steel gears, oil treated. The counter shaft gears are keyed and forced on by hydraulic pressure, spaced by tubing separators, the reverse gear is forged integral with its shaft and the gear on the opposite end is riveted in place. The drive shaft is round with four keys milled into it, hardened and lapped to size and bearing, making them absolutely interchangeable. Both shafts, counter and driver are on Timken Roller bearings and are adjustable for wear and the drive has end thrust ball bearings. The final drive to the rear axle is by bevel gear and shaft to a floating type rear axle with spur gear differential and roller bearing each side of the driving pinion and also one either side of the differential gear casing with a ball thrust at the end of the drive pinion. For setting the mesh of the gear and pinion a nut adjustment is provided. The driving shaft under load is perfectly horizontal. The real axle is heavy steel tubing, riveted and brazed and the brake hangers and dust flanges are cast steel. Two large and powerful brakes, internal expanding and external band are provided on the rear wheel hub drums. The external band is lined with camel hair fabric. These brakes hold both ways positively the internal being operated by a hand lever, external by foot-lever. A 1⅝ inch nickel steel floating axle transmits power to the hub clutch plates in each rear wheel. The front axle is the I-beam type of solid one piece forging, the center of it being the lowest point of the car.

The pivot point of steering knuckle is supported on hardened thrust bearings.

STEERING GEAR

The steering gear is of the worm and gear type, the gear being a complete wheel forged integral with its shaft, in-

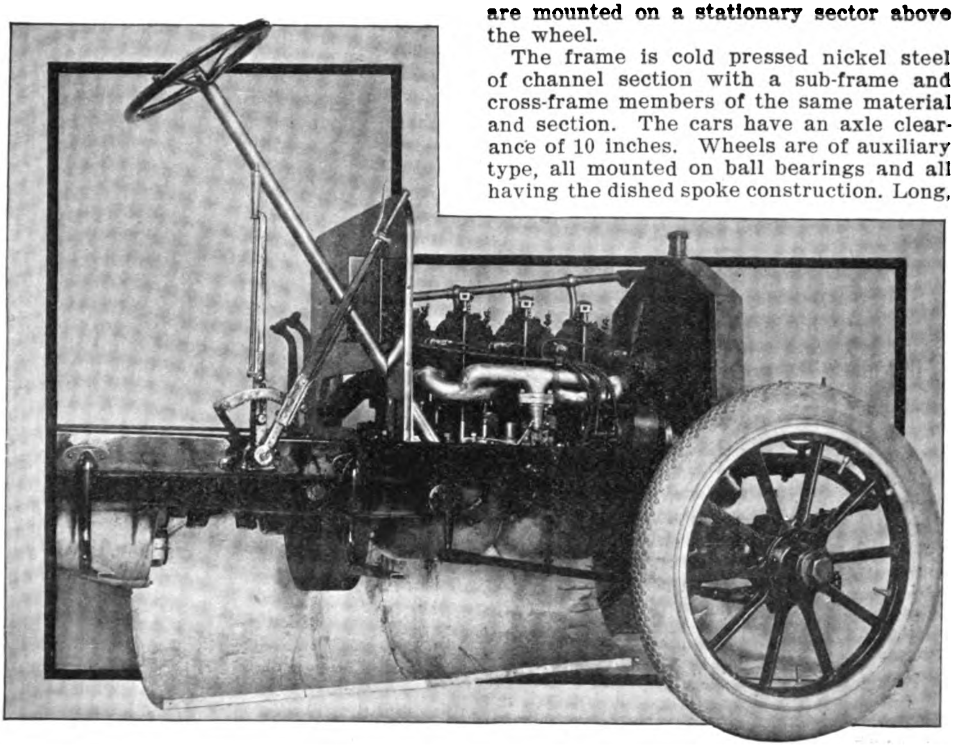


Fig. 4. Great Western chassis, forward end. Great Western No. 21; 40 H. P., four-cylinder motor, 4½ bore, 5½ stroke. This view shows motor installed in frame and the method of dropping the under pan, making the under portion of the chassis accessible. It also shows the gear shifting levers and the clutch and brake pedal and the practically clear dash.

suring great strength and providing a greater amount of wearing surface. A dust-proof, cast steel case surrounds it and eccentric bushings are provided for adjustment to take up wear. All parts are drop forged. The steering post has considerable rake and is surmounted by a Circassian walnut wood-rimmed wheel. The usual spark and throttle hand levers are mounted on a stationary sector above the wheel.

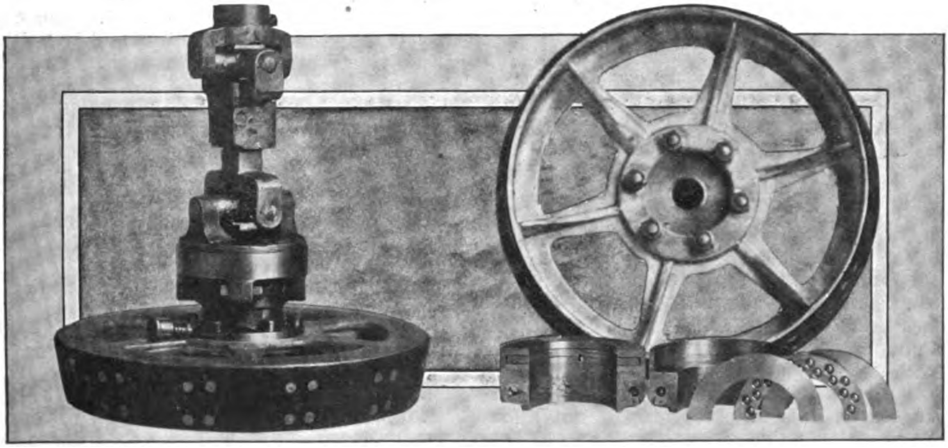


Fig. 5—Views of the Great Western car's composition covered aluminum cone clutch. Also the double sliding universal joint, and at the right the ball thrust yoke used for engaging clutch instead of the usual form of yoke ordinarily employed.

The frame is cold pressed nickel steel of channel section with a sub-frame and cross-frame members of the same material and section. The cars have an axle clearance of 10 inches. Wheels are of auxiliary type, all mounted on ball bearings and all having the dished spoke construction. Long, flat easy-riding springs are fitted to all the models, those on the front of No. 20, being 2x38 inches, and the rear are 1¼x38 inches. On No. 21 the rear are 1¾x40 inches and 2x40 inches at the front. The rear springs of both these models are full elliptic. All springs of No. 22 are semi-elliptic, those at the front being 2x40 and at the rear 2x56 inches, which is an exceptionally long spring. The fenders are of metal, ample weight and graceful design. A metal pan, hinged at one side encases and protects the under part of the car. This can be quickly removed, giving access to the entire under side.

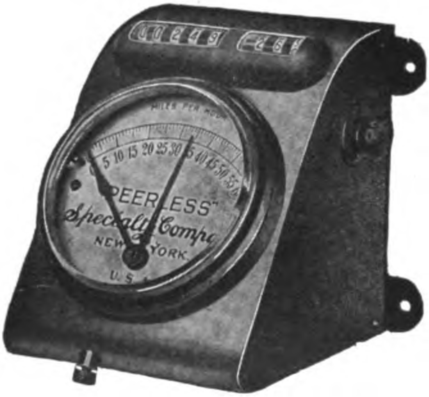
The change speed gears are controlled by a lever at the right, the high speed being obtained by moving the lever toward the driver. The other lever, as usual, controls the emergency brake. One pedal controls the remaining brake, and the other the clutch.

Considerable attention has been given to making the position of the driver comfortable. For this purpose considerable space has been allowed between the front seat and the dash. The tonneaus are also long and roomy. The upholstering and paint are automobile red, with hand buffed leather trimmings. The runabouts, however, are finished in French gray and upholstered in black. The wheel bases of the cars are as follows: No. 20, 106 inches; No. 21, 114 inches; No, 22, 122 inches, with treads 56 inches. No. 20 has 32x3½ inch tires; No. 21, 4x34 inch tires, and on the large car the front wheels are 36 inches with 4 inch tires, and 4½ inch tires are used on the rear. All cars are equipped with two gas lamps, one generator, two oil lamps, a tail lamp and tool kit, which includes jack, pump and tire repair kit.

## THE "PEERLESS" SPEEDOMETER

This instrument is the product of the Peerless Specialty Co., of 1876 Broadway, N. Y. City, and one of its most conspicuous features is the fact that the odometer can be read from the tonneau seat.

The odometer wheels are pure white with neat black numerals and are driven from a steel worm or drive shaft connecting with a worm gear and a shaft to a 10 tooth, 48 pitch gear connecting with a 40 and 10 tooth combination gear to a 50 tooth gear which drives the season odometer shaft which registers 9,999 9-10 miles, then repeats. The trip odometer is run from the 40 and 10 tooth combination gear connected to shaft running through instrument to another 50 tooth gear. The odometer numerals are operated with six tooth geneva gears, every other tooth being milled to width of odometer wheel. This arrangement is absolute and will not allow odometer to skip or jump miles.



The "Peerless" Speedometer.

The season and trip odometers work independently of each other when resetting trip.

The governor is made of brass and so arranged as to be calibrated from five different points insuring absolute accuracy from 1 to 60 miles. Spring tension is used, but as the governor has only 3-16 inch travel, that there is practically no wear, or possibility of getting out of order.

The governor slide is made of brass, working up and down on a burnished steel shaft driven from a 48 pitch 35 tooth bronze bevel gear connecting with a 20 tooth steel gear; the shaft runs on point and cone bearings, hardened, ground and lapped. The slide is slotted to receive a steel ball that actuates the speed indicating hand. The steel ball is hardened and burnished and attached to a 110 tooth, 110 pitch gear that meshes with a 110 pitch, 35 tooth gear fastened to the staff of the speed hand.

The extreme movement of the slide is 3-16 inch.

The drive shaft is made of tool steel and runs in ball bearings, insuring long life of the flexible shaft. The drive shaft is made from 16 strands of the best piano wire wound in four layers and runs in a flexible brass casing, steel lined. The casing is filled with cosmoline and graphite to lubricate and insure shaft from crystallization.

The maximum hand is operated by a pin from the speed hand and held in place by a 300 tooth ratchet gear and spring which locks it until a button at the bottom edge of the instrument is pressed which releases lock and is returned by watch spring connected with hand staff.

Pinion and sprockets are cut out of steel ¼-inch thick, and hardened to proper temperature.

The announcement of the White Company that its 1909 models will use California distillate as fuel, which costs 6 cents per gallon, as against 25 cents for gasoline has caused some comment. In addition to the economy in the cost per gallon, it is claimed that distillate will run 20 per cent, farther on a gallon than will gasoline, thus reducing the cost of automobile operation for fuel to about one-fourth the previous cost.

**Stevens-Duryea**

**New Models**

**XXX and Y**

will be on exhibition at the Association Licensed Automobile Manufacturers' Show, Madison Square Garden, New York City, January, 1909.

The XXX— a 24 Horse-Power Four Cylinder Runabout. Price - - - - $2850

The Y—a 6-40 Horse-Power Six Cylinder Touring Car. Price, - - - $4000

**Stevens-Duryea**
**1909 Models**

will also include the famous Light Six Model U and Four Cylinder Model X.

**S-t-e-v-e-n-s-D-u-r-y-e-a**
SPELLS
**Uniformly Good**
**Year After Year**

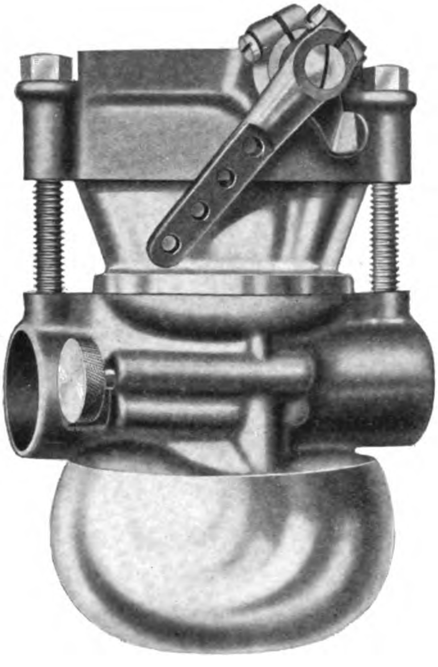
Send for latest descriptive literature.

**Stevens-Duryea Company**
**Chicopee Falls, Mass.**
Member Association Licensed Automobile Manufacturers

## THE "STEWART" CARBURETOR

The Stewart carburetor is manufactured by Alfred C. Stewart, 1008 Santee street, Los Angeles, Cal. A complete description of its operation follows:

Assuming the engine to be running, the air, entering the carburetor through the inlet openings in the side of the body, raises the spraying valve until just sufficient opening is formed between the spraying valve and spraying ring to let it pass.



The Stewart Carburetor

The amount of lift of spraying valve will be in direct accordance with the amount of air passing, as it must lift high enough to let it pass, but its own weight will keep it from lifting higher.

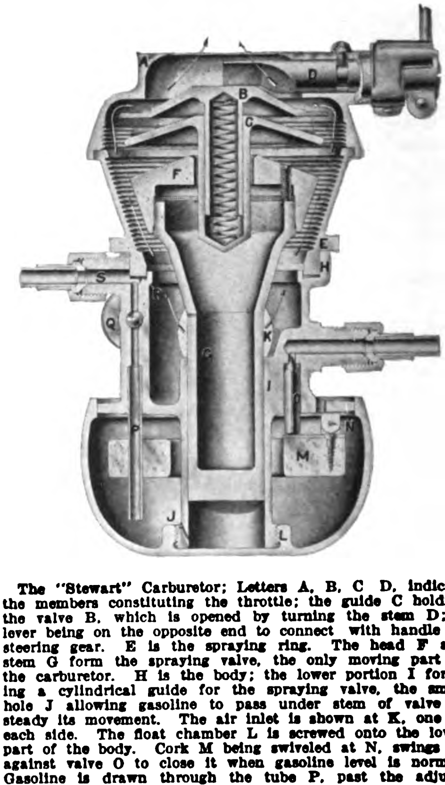
This definite position of the spraying valve, in relation to the air being drawn through, is utilized to determine the gasoline supply. The air in passing by the gasoline orifice at the base of spraying ring is constricted in its flow by the central tapered portion of the spraying valve, the partial vacuum thus formed drawing gasoline up from the float chamber and out through the gasoline orifice into the rapidly moving air, which combs it over the surface of the spraying ring where it mixes with the air.

The intermittent flow of air through carburetor, due to the successive piston strokes of the engine, would cause the spraying valve to pulsate or flutter. This, however, is prevented by allowing gasoline to flow under the stem of the valve through the small drill hole J; the stem being a nice fit in the lower part of the body it can only move at a rate which allows the gasoline to flow in or out through the small hole, allowing it to respond to any throttle change, but holding, by the slowness of its action, against any fluttering or pumping.

### SPRAYING CAPACITY.

As previously mentioned the lift of the spraying valve is only according to the amount of air being drawn through. The velocity of the air past the valve will be constant regardless of the speed of the engine; no matter how slowly the engine may be running the air will pass between the spraying ring and valve at a very high velocity, due to the weight of the valve.

The gasoline flowing out of the orifice (between the ring and body) around the entire circumference of the ring is naturally in a very thin sheet or film when it reaches the rapidly moving air current. It is then carried over the surface of the ring and broken into the finest atoms, which are absorbed by the air and form a perfect gas without the aid of heat.



The "Stewart" Carburetor; Letters A, B, C D, indicate the members constituting the throttle; the guide C holding the valve B, which is opened by turning the stem D; a lever being on the opposite end to connect with handle on steering gear. E is the spraying ring. The head F and stem G form the spraying valve, the only moving part in the carburetor. H is the body; the lower portion I forming a cylindrical guide for the spraying valve, the small hole J allowing gasoline to pass under stem of valve to steady its movement. The air inlet is shown at K, one on each side. The float chamber L is screwed onto the lower part of the body. Cork M being swiveled at N, swings up against valve O to close it when gasoline level is normal. Gasoline is drawn through the tube P, past the adjusting screw Q, into the annular space R, and out through the gap between the spraying ring and body. The connection S need not be considered here, as it has no part in the normal working of the carburetor, but is for a special attachment.

### CORRECT PROPORTIONING OF GASOLINE AND AIR.

The spraying valve fitting very closely in the conical spraying ring, it is obvious that it must lift to let any air through. As it is held down by gravity alone, the amount that it will lift depends alone on the amount of air passing; so it must always assume a certain definite position in relation to the ring and body for any given amount of air.

Now the gasoline is drawn into the air by the partial vacuum due to the central portion of the valve not allowing quite enough room for the air to pass freely. The form of this part is determined in the shop (by experiment) and is such that no matter what position the valve may be in, the air will be constricted just enough to draw in the correct amount of gasoline for that amount of air. For example: if the throttle were wide open and enough air being drawn through to raise the valve to the top of its stroke, the small part of taper would be opposite gasoline orifice and make a comparatively large opening for the air to pass through but still check it enough to make the required vacuum on the gasoline. If only a little air is being drawn through, the valve will only raise a little, and the large part of taper will be opposite gasoline orifice, making a comparatively small opening for the air, but still enough to make a slight vacuum on gasoline, as little gasoline is required for so small an amount of air.

### STARTING.

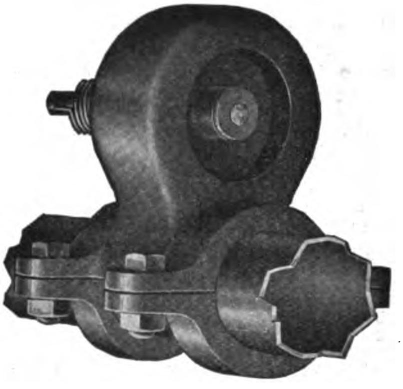
When engine is at rest and no air moving in carburetor, the spraying valve will rest on shoulder formed at top of body, so that no air can pass unless valve raises. A little clearance is left between valve and spraying ring, so that when the engine is turned slowly by hand, the slight vacuum formed will not raise the valve but will draw directly on the gasoline, thus flushing the carburetor. The moment the engine starts the valve will raise off from shoulder and the correct mixture will be supplied.

## NEW "PERFECT" PEDALS, ETC.

In addition to the new specialties described on page 133 of our November issue, Garage Equipment Co., Milwaukee, Wis., are including in their 1909 line three other new specialties as illustrated herewith.

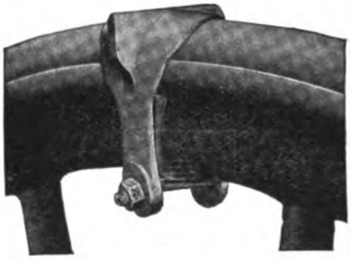
The "Perfect" Locking Pedal, Style K. Style D.,

The "Perfect" Locking Pedal, Style K, is designed for throttle control, horns, whistle and muffler cut-out. The pedal opens and closes the throttle freely when the toe covers the entire face of the pedal, but will lock in any position by simply sliding the toe to the right allowing the ratchet arm to spring up and the notches of the ratchet to engage the frame of the pedal, holding it firmly until released by again covering the entire face of the pedal and pressing the ratchet arm down with the toe. This pedal lists at $1.50 in black and $2.25 nickel-plated or brass.



"Perfect" Muffler Cutout.

The Style D Muffler Cut-out is made of malleable iron and clamps on the exhaust pipe after a V-shaped hole has been cut in the pipe. The valve is in a pocket at the bottom and opens inward. It will not leak, as the conical valve is held against the seat by the pressure of the exhaust in addition to the spring. The body forms a pocket to accumulate the residue and carbon from the engine, which will clear itself automatically when the valve is opened, thus preventing the clogging of the muffler. This cut-out is furnished in six different sizes to fit standard pipes. The prices range from $2.50 to $3.75.



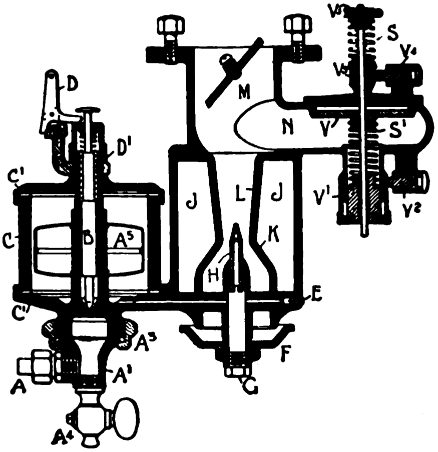
"Perfect" Emergency Mud Hook for Solid Tires.

The "Perfect" Emergency Mud Hook for solid tires is constructed so that it can be left on when out of the mud, as the total projection beyond the rubber tire is only 3-16 of an inch. It is made of malleable iron and is clamped on the wheel with a bolt. The prices run from 30 cents each for 1¼ to 1⅜-in. tires up to $1.00 each for 4-in. tires.

## STROMBERG CARBURETORS WITH GLASS BODIES

Two types of carburetors are made by Stromberg Motor Devices Co., 13th Street and Michigan Avenue, Chicago, Ill. Type A is here shown in section and Type B in both section and exterior views. In Stromberg carburetors the gasoline is supplied to the motor in a fixed ratio to the air which is automatically controlled by suction.

Referring to the sectional cut of type A it will be noted that the open spraying dome (H) is perpendicularly fixed in the mixing chamber (L) at a point where the air attains its highest velocity. Hence the gasoline is delivered in a canopy-shaped spray resulting in a high degree of vaporization even at low speeds. A large water jacket (J) surrounds the mixing chamber. The fixed air inlet is adjusted by means of cup (F). As the quantity of gasoline supplied to the motor is governed by the quantity and velocity of the air admitted through the fixed air inlet, the carburetor may be adjusted to furnish just the proper mixture to give best results on any particular motor by proper manipulation of the springs (S) and (S-1) and the cup (F). As the ratio of gasoline and air is automatically controlled by the suction of the piston, the mixture is correct for any motor speed.

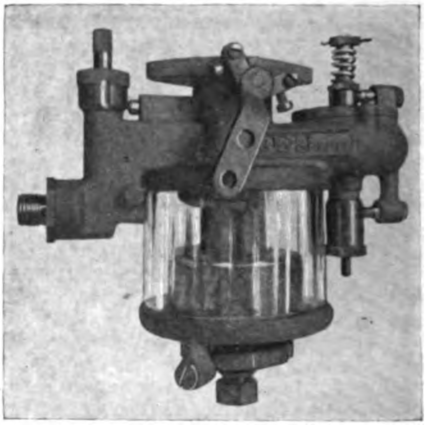


Sectional View Stromberg Type A Carburetor.

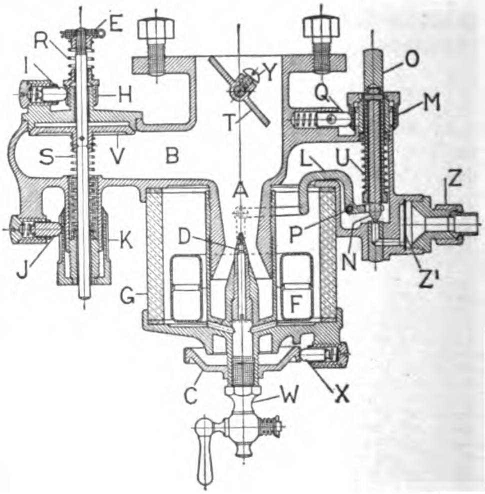
Great flexibility is obtained by the use of a sensitive auxiliary air valve (V) which is controlled by two springs (S-1) controlling the valve at slow and medium speeds and (S) at high speeds. These springs are adjusted by means of locknuts (V-1) and (V-3) which have grooves in their sides and are held securely in position by plunger (V-2) and (V-4). The spring (S-1) is so proportioned that the slightest opening of the throttle valve (M) produces a corresponding opening of the air valve (V).

To make engine starting easy this carburetor is provided with a priming arrangement consisting of a lever (D) which when raised lifts the gasoline valve (B) causing the gasoline to rise and overflow the spraying dome (H) into air cup (F). Hence the engine draws gasoline not only from the spraying dome but the air cup and gets a very rich mixture.

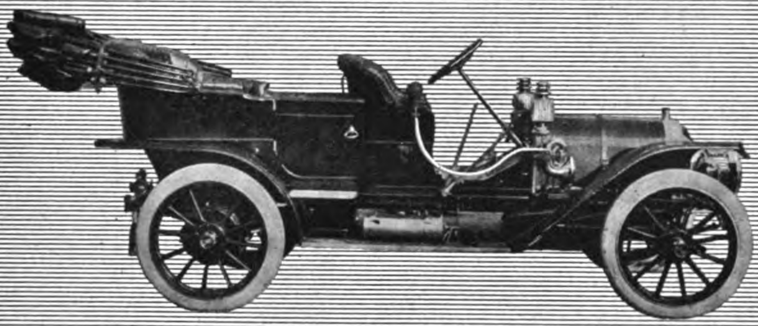
The gasoline chamber is of ample size and a large and substantial metal float (A-5) is used. The needle valve (B) is also of substantial proportions and has a balancing spring (D-1). It has a ground seat. To avoid the possibility of particles of foreign matter getting under the valve a gauge screen is fitted in the coupling joint (A-3). The float chamber is provided with a specially made Macbeth nonbreakable glass wall, ¼ inch thick. Specially constructed cork gaskets top and bottom insure against leakage. This glass gasoline chamber is one of the exclusive features of the device and enables the operator to observe the fuel level and workings of the parts at any time. All parts of the carburetor are interchangeable and readily accessible. Fives sizes of Type A, (1, 1¼, 1½, 1¾ and 2-inch) ranging in price from $22.50 to $45.



Exterior View Stromberg Type B Carburetor.



Sectional View Stromberg Type B Carburetor.



# HAYNES

**The Haynes for 1909.**

**40 H. P. $3,000**

## Cars That Go Are The Cars That Sell

**Haynes cars run. They always run. In the Agents' Parlance, they "stand up."**

Dive into the Haynes mechanism and you will see why.

There's a clutch that is really jerk-proof, working like a contracting band brake, metal to metal, so that you cannot convey a shock to the motor if you try. That means long motor life

No leather to renew on the clutch—long clutch life.

A ratchet in the gears preventing stripping—long gear life.

Brakes water-cooled, non-burning—long brake life

A unique direct-drive system that saves wear, friction, thrust and noise, and solves the old rear axle problem. Long life there.

Solid, substantial construction all over—long life all over.

No wonder the two Haynes cars were both among the five that won perfect scores in the great Chicago Motor Club Reliability Run.

The Haynes always makes a perfect score.

**AGENTS!** **Do you realize what such facts mean to you? Your profits are not eaten up by efforts to keep the cars running after they are sold. And when the result of a big Reliability Run is telegraphed to every paper in the country, with Haynes Perfect Scores always sticking up in the record like the proverbial sore thumb—do you see where you get off if you have the rights in your territory? We're ready to talk business.**

### SPECIFICATIONS OF THE HAYNES FOR 1909

Motor—4 cylinder, 4¾ x 5.

Water Cooled, with very large water jacket.

Drive—Shaft drive, with Haynes roller-pinion and sprocket at the rear axle, which minimizes friction and side thrust and eliminates noise entirely.

Clutch—Haynes patent contracting steel band upon bronze drum.

Carburetor—Latest type Schebler; water jacketed.

Lubrication—Gear driven McCord oiler.

Ignition—Bosch Magneto; also battery system with single coil and separate set of plugs.

Bearing—Roller bearings used throughout.

Tires—36 x 4 all around.

Transmission—Selective type, three speeds forward and reverse. Ratchet device makes gear stripping impossible.

Wheel base—112 inches. Tread—56 inches.

Body—Touring car for five or seven, or toy Tonneau, $3,000. Runabout or Hiker type, $2,900. The Hiker type consists of two bucket seats with large gasoline tank on rear.

Equipment—Includes Prest-O-Lite tank, baggage rack and tire holders.

HAYNES AUTOMOBILE COMPANY, Kokomo, Indiana

Oldest Automobile Manufacturers in America. MEMBERS A. L. A. M

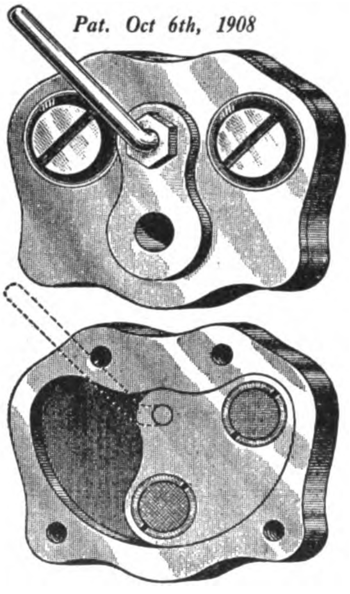
NEW YORK, 1715 BROADWAY

CHICAGO, 1702 MICHIGAN AVENUE

*42 HIGHEST AWARDS AND PERFECT SCORES*

## A DOUBLE STRAINER GASOLINE TRAP

Oscar Schoge, 554-558 Evergreen ave., Brooklyn, New York, has placed on the market a new type of gasoline strainer designed to overcome the necessity of instant removal of a strainer in case it became clogged. This new strainer is called the "Racso" twin gasoline strainer and as its name suggests it contains two strainers instead of one, either of which may be brought into working position instantly by moving the small lever shown. The device consists essentially of a sliding valve having an oscillating motion. The valve contains two circular strainers so disposed that when the lever is pushed to one side one is in line with the gasoline flow and when the lever is pushed in the opposite direction the other strainer is brought into line with the flow. If the strainer in use gets clogged, it is not necessary to stop the engine and clean out the sediment, as the clean strainer can be thrown into action instantly and the clogged strainer may be removed and cleaned at the end of the trip.



The "Racso" Twin Gasoline Strainer; exterior and interior views.

This device is made of cast brass in ⅛ and ¼-inch sizes, with or without drain cock. Price is $4.

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## THE "DELTA" BATTERY BOX

The Delta Mfg. Co., Bloomfield, N. J., have brought out a new container for dry cells which is designed to insure against the dangerous results of incorrect wiring, to prevent damage from wetting, etc., and thus to get longer service from the battery. This battery box is made in three sizes to hold 8, 10 and 12 cells respectively and goes on the running board or under the seat, being operated from the regular dash board switch.

In this box each cell is separated from the others by partitions which are ½ inch higher than the cells. The connections pass over the top of the partitions and contact between connector ends or binding posts is impossible.

The "Delta" Battery Box.

Another important feature of this box is a switch which permits three different groupings of the cells enabling the user to get all the service possible out of them. This switch is very simple and is operated with three plugs, the first combination leaving each set independent of the other, to be used alternately from dash board switch in usual manner. The second combination, which is used when batteries have reached the point where ordinarily they would have to be thrown out, couples the two sets in multiple series, combining the amperage of both sets. The third combination throws all the batteries in one series set, restoring the voltage to about its original pressure.

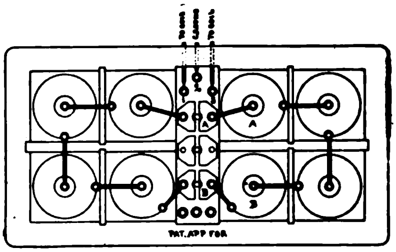

Diagram of cell connections in the "Delta" Battery Box.

The 8-cell size of box lists at $7.50 and the 12-cell at $9. The dimensions of No. 1 are 15¾x7½x8½ inches and of No. 2, 21½x7½x8½.

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J. J. Deal & Son, Jonesville, Mich., will soon be on the market with a new motor buggy they have been working on for some time. The new car will be described in a future issue of the Journal.

F. E. Castle, well-known in automobile lamp manufacturing circles, has acquired an interest in the Atwood Mfg. Co., of Amesbury, Mass., which concern will hereafter be known as the Atwood-Castle Company.

**The Autocar**

Established 1895

## The Leading British Motor-Car Paper

**Established in advance of all others and still far ahead of them all**

*Profusely Illustrated*

¶ "The Autocar" provides, week by week, an interesting and authoritative review of the progress of automobilism in the United Kingdom, and should be read by every progressive maker and dealer, who "knows how" to benefit by the experience of others.

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P. O. Order to be made payable to "The Autocar"

¶ American manufacturers of motor vehicles and accessories who wish to expand their business should look to the British Isles. The market is a rich one and by advertising in "The Autocar" it is possible to reach the entire BUYING section of the public which is interested in automobilism.

**May we quote you our advertising rates?**

**ILIFFE & SONS, Ltd.,** 20 Tudor Street
London, E. C., Eng.

## THE "PURITAN" COMBINED GASOLINE GAUGE AND STRAINER.

The accompanying cut shows a diagram of the Puritan Combined Gasoline Gauge and Strainer attached to the dashboard. This device is manufactured by the Central Brass & Fixture Co., Springfield, Ohio, and shows at a glance the depth of gasoline in tank, at the same time preventing water or other foreign substance going to the carburetor.

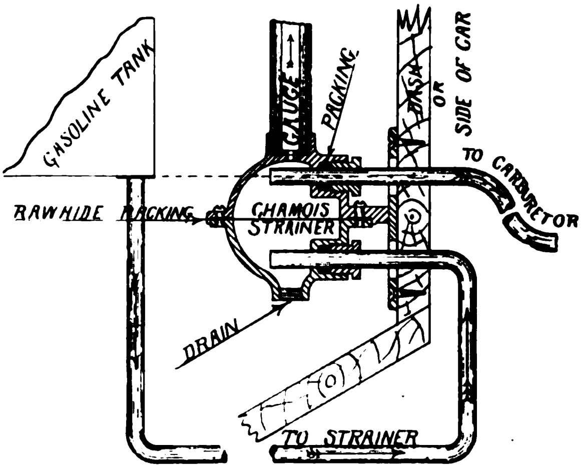
PATENT PEND

The gauge glass is made of extra quality French plate. The amount of gasoline in tank is indicated by a red ball floating at the top of the column of gasoline. The metal portion of the device is made of highest grade yellow brass.

The strainer contains an imported chamois disc located between the lower sections of the instrument, which keeps all foreign substances and water in the lower half, and allows the same to be drawn off by means of the pet-cock. The device can easily be attached by anyone and requires no special tools. It is made in three standard sizes of like design for tanks of six-inch depth and less, and for tanks of eight-inch and ten-inch depths and intermediate sizes. The list price for these sizes is $9.00. For tanks of greater depth than ten popular for the 1909 trade not alone be- inches gauges are furnished at a slight extra cost accordingly.

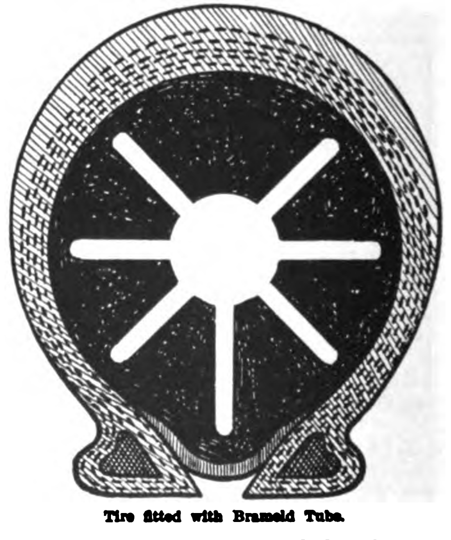
## BRAMELD NON-COLLAPSIBLE TIRE TUBE

A non-collapsible tube for automobile tires was recently placed on the market by William Brameld & Co., 20-24 Hoffer Street, Paterson, N. J. It is intended to take the place of all-air tubes and is of the cushion type as will be seen by reference to the accompanying cut. This tube is inflated in the usual manner but if it is punctured in use it cannot completely collapse as the air space is in the form of slots radiating from a central air chamber and the tube can only collapse sufficient to close up the small slots. Even when so deflated this tube, it is claimed, is quite resilient and, therefore, repairing on the road is quite unnecessary.



Sectional view of the Puritan Combined Gasoline Gauge and Strainer.

This tube is of course less likely to get punctured than the ordinary all-air tube as there are only a few vulnerable points (at the outer edges of the air-slots) and the tread portion is thick enough to be entirely immune from puncture.



Tire fitted with Brameld Tube.

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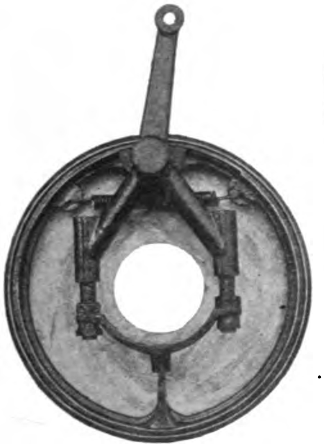
Mr. Henry, for six years general representative of the Electric Vehicle Co., and recently with the E. M. F. Co., has severed his connection with the latter concern and taken the sales managership of the newly organized Interstate Automobile Co., of Muncie, Indiana.

### CLARK EXPANDING BRAKES

Edward S. Clark, 242 Freeport Street, Boston, Mass., has placed on the market a line of internal expanding brakes which are applicable to any runabout or touring car using artillery wheels. The brake here illustrated is designed to fit the Stanley small touring car or runabout, Models BX, CX, D and G using artillery wheels. This brake has bronze shoes and is connected with a locking hand lever with latch on the quadrant. The handle of the lever and the latch are nickel or brass plated, the rest of the lever being left for painting. In requesting quotations, customers should mention make of car and model number.



Clark Expanding Brake.

### "SPE-DE-SHYNE"

"Spe-De-Shyne" is a new metal polish lately placed on the market by The Cleanola Co., Fulton Building, Pittsburg, Pa., the well-known makers of Cleanola car body cleanser. Spe-De-Shyne has been brought out to meet the demand for a satisfactory metal polish that will produce results with a minimum of effort. Hence it is advertised as "the metal polish with the elbow grease in the can."

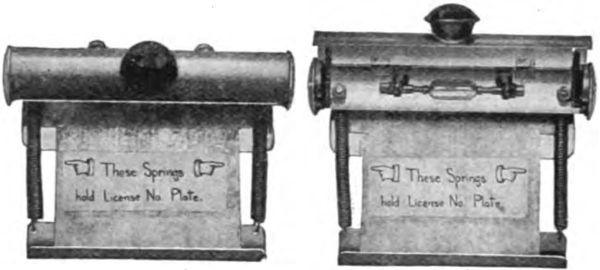
It is said to quickly dissolve oxidation and discoloration with little friction and it does not dry white. In composition it is homogeneous and does not settle to the bottom of the can. Atmospheric conditions do not affect it. No acid is used in it and it neither harms the metal nor leaves any greasy appearance on the polished surface. Prices range from 15 cents for a 6-ounce can to $1.50 per gallon. Discounts are quoted to dealers.

### FOY'S LICENSE HANGER HOLDER

Barney Foy, Brookline, Mass, has placed a very useful and practical device on the market in the shape of a combined rear light and number holder. The lamp is of the electric variety and is fastened permanently to rear of car. It can be lighted from any ignition battery. Bulbs are furnished for 4, 6 or 8 volt battery.

The electric globe is retained by two spring terminals preventing any possibility of its becoming loose or dropping out. There are no screw ends to watch.

The lamp filament is on a horizontal line, thus reflecting the light to both ends of the number plate, and is placed directly in front of a ruby diamond cut glass for rear danger signal. The rear half of the lamp box is hinged to facilitate cleaning the silver plated interior reflector.

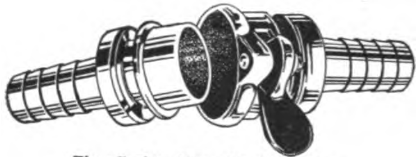

These Springs hold License No. Plate.
These Springs hold License No. Plate.

Foy's Rear Light and License Hanger Holder.

The number plate holder is attached to the lamp and arranged so that it will receive any size number or state plate instantly through the medium of spiral springs, without the use of wrench or screw driver, it merely being necessary to insert the new plate holder by hand. This device lists at $10.

### TIME-SAVING HOSE COUPLING

This is a very simple but apparently very effective hose coupling that has been placed on the market by A. W. Findlay Co., 23rd and Market Sts., Philadelphia. One portion of the coupling contains a groove between the main shoulder and a flange-like projection a short distance from the same. Against the shoulder a packing ring is placed. When the two portions of the coupling are brought together a small lever is pushed over, operating a cam, which, bearing against the flange above referred to, forces the two parts tightly together, the packing ring making a water-tight joint.

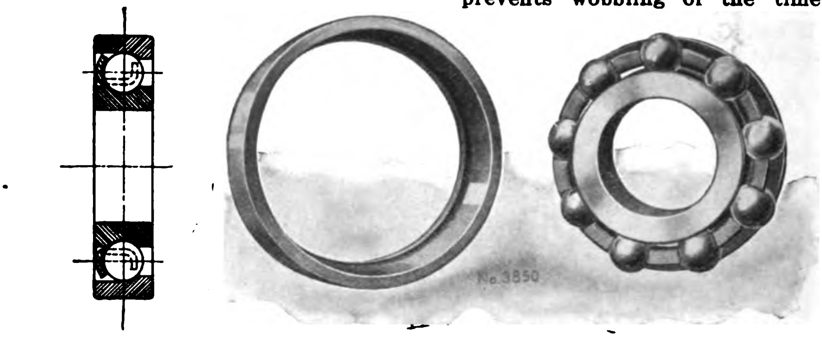


Time-Saving Hose Coupling Open.

The Ajax-Grieb Rubber Co. announces a reduction in the prices of its tires to meet the reductions by other makers. This company, which originally went against the tire makers' combination, states that it will meet any and all reductions in price. The Ajax tires are guaranteed for 5,000 miles running.

## A NEW HESS-BRIGHT MAGNETO BEARING

The Hess-Bright Manufacturing Company, 2102 Fairmount Ave., Philadelphia, as well as the manufacturers of the German D W F Bearings at Berlin and of the French D W F at Paris are now offering for general use a new magneto bearing after that has been thoroughly tested out by a season's practical use.



The New H-B Magneto Bearings

This magneto bearing follows in the main the general annular type of which this firm was the originator. The inner race is grooved in the usual way, but the outer race is grooved at one side only. The balls are held in a special short steel retainer.

Three sizes are at present being regularly furnished:

| Bore | | Diameter | | Width | |
|---|---|---|---|---|---|
| mm. | in. | mm. | in. | mm. | in. |
| 7882—10 | .39370 | 28 | 1.10236 | 8 | .31496 |
| 7802—15 | .59055 | 35 | 1.37795 | 8 | .31496 |
| 7778—17 | .66929 | 44 | 1.73228 | 11 | .43307 |

Other sizes are furnished on special demand and will be added to the stock sizes as the demand indicates the advisability of carrying them.

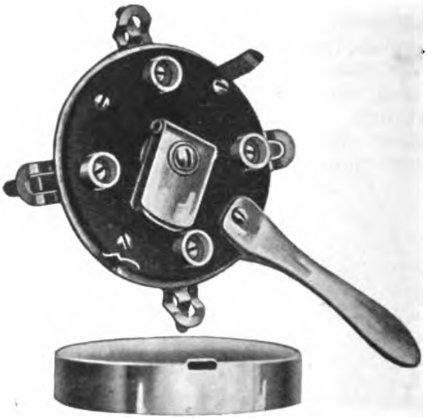
## A SIMPLE CONSTRUCTED MODERATE PRICED TIMER

Palmer-Moore Co., Syracuse, N. Y., are now making a neat, light, simply constructed timer listing at $3 for single cylinder engines up to $3.75 for 6 cylinder engines. Special discounts are given on quantity orders.

This timer consists mainly of a brass sleeve having a flange extending between two discs; one of brass (the back plate); the other of fiber and carrying the contact pieces. The discs rotate on the sleeve to advance or retard the spark, the intervening flange affording sufficient friction to hold the timer in any desired position.

The method of attaching this timer is also very simple. A short stub shaft is fitted to which the revolving cam is pinned. Inside the shaft is a slotted taper sleeve. The timer is slipped on the end of the cam shaft and a screw in the stub shaft tightened. This draws up the taper sleeve which securely grips the cam shaft. A brass bushing (not illustrated) is pressed into the brass sleeve and is provided with lugs for attaching so that it cannot turn. When the bushing is held the sleeve is also held and to advance or retard the spark the timer turns on the sleeve as explained above. This method of fastening prevents wobbling of the timer as the movement of the timer is independent of the fastening which remains permanent and stationary.

The contacts are hardened steel cups and the cam is also hardened steel. All parts are easily removed or replaced and of the simplest design. The cover, back plate and wire terminals are stamped from sheet brass for lightness and strength. The whole timer weighs only 10 ounces. All parts are firmly bolted together. The handle shown in the cut is for marine use but the automobile type is fitted with a handle adopted for connecting with the spark lever rod.



The Moore Timer, disassembled.

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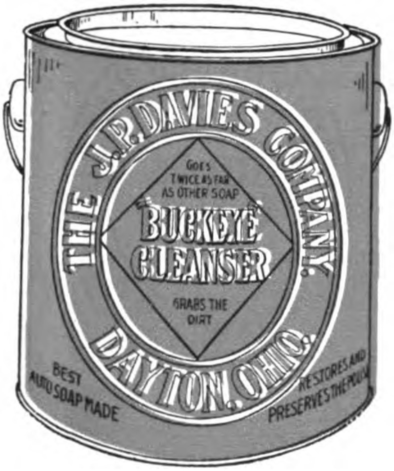
R. B. Jackson has resigned as general manager of the E. R. Thomas Motor Co., of Buffalo, and announces to the trade that he has rented the old Northern plant at Detroit, at the corner of Champlain Street and Canton Avenue, and will there start in the manufacture of automobile parts within the next few months.


THE J. P. DAVIES COMPANY.
DAYTON, OHIO.
GOES TWICE AS FAR AS OTHER SOAP
BUCKEYE CLEANSER
GRABS THE DIRT
BEST AUTO SOAP MADE
RESTORES AND PRESERVES THE POLISH

# "Buckeye"

## The Soap that makes Autos look like new

¶ Don't take any chance on sending your car to the paint shop to save a few pennies on your Soap bill. Use Soap that **preserves** the finish.

¶ "BUCKEYE" has taken the lead among Auto Soaps—and it deserves the leadership. It's made **right**. The **quality** is there—and it's **quality** that counts. No smoky, dingy, streaked appearance to the car—no early visits to the painter when you use "BUCKEYE." It goes after grease and grime in a way that the ordinary Soaps can't do—contains no alkali—cannot injure the finish—cleans thoroughly and quickly—brings out the original lustre and **preserves the finish.**

¶ Has more body, too, than the ordinary kind and is more economical.

¶ We need only to **sell** you the first order—you'll come to us and **buy** the second. One trial is all that's necessary to convince you that it's the Soap you ought to use all the time. Use it once and you'll never be satisfied again with the ordinary kind. Lots of substitutes but don't take them. **Insist on "BUCKEYE."**

"BUCKEYE" IS PUT UP IN

| | | | |
|---|---|---|---|
| Barrels | 450 lbs. | Pails, 25 lbs. | 2 per crate |
| Half-barrels | 225 lbs. | Pails, 10 lbs. | 6 per case |
| Kegs | 125 lbs. | Pails, 5 lbs. | 12 per case |

**SOLD BY ALL LEADING GARAGES and SUPPLY DEALERS. ASK FOR IT**

## THE J. P. DAVIES CO., Dayton, Ohio

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Austin
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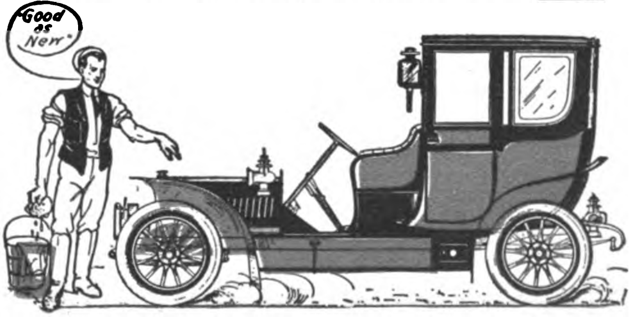


# Goodrich Tires

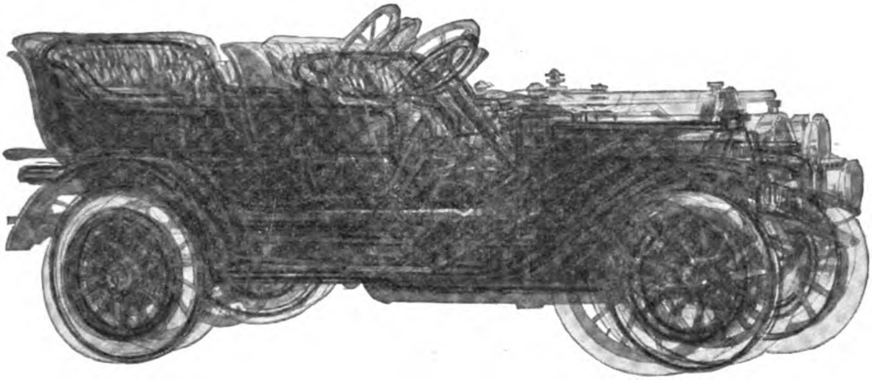
The Regular Equipment for 1909 on the

Pierce Arrow Winton
Stoddard Dayton Stanley
Franklin Premier Rambler
Auburn Great Smith Moline

THE selection of Goodrich Tires by such well-known manufacturers as The George N. Pierce Company, Winton Motor Carriage Company, Dayton Motor Car Company, Thos. B. Jeffery Manufacturing Company, H. H. Franklin Manufacturing Company, Premier Motor Manufacturing Company, Auburn Automobile Company, Smith Motor Car Company, Stanley Motor Car Company and Moline Automobile Company is significant not only to the patrons of these manufacturers, but to all motordom.

¶ It is a seal of approval from those best able to judge the relative merits of automobile tires--and those who want the best.

**THE B. F. GOODRICH COMPANY**
**AKRON : : : : : : OHIO**



GOODRICH TIRES

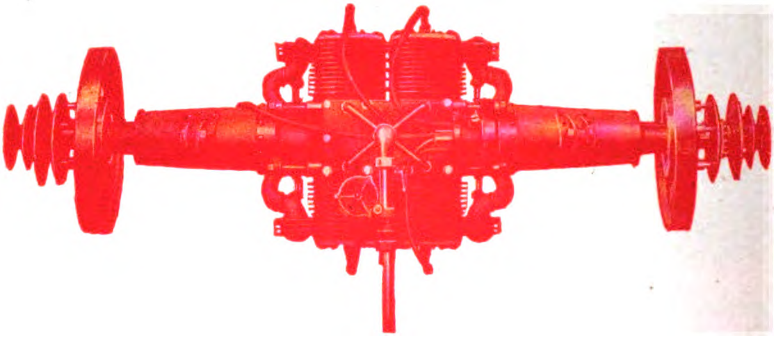
THE composite "shadowgraph" of these motor cars reveals the average tendency of leading American designers. A composite of all the Goodrich Road Records would reveal how largely Goodrich Tires have ***justified their selection*** in practically every endurance contest of importance in America--including the last four Glidden Tours--as well as in the hands of thousands of users.

*In Every Sense of the Word*

*"The Tires with a Record"*

THE B. F. GOODRICH COMPANY
AKRON : : : : : : OHIO

# The Most Remarkable Motor in the World

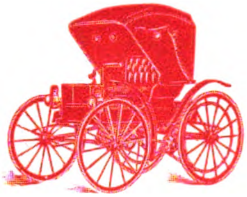


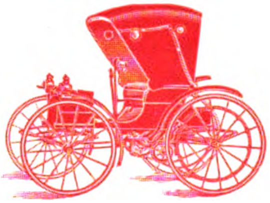
## New Four-Cylinder All Ball-and-Roller Bearing Motor

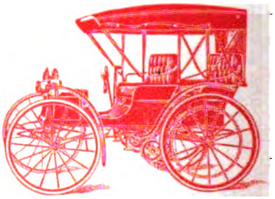
MOST motors have plain bearings—some of them have ball or roller main bearings—but the Holsman is the only motor in the world that has every bearing a ball or roller bearing, and thus absolutely insures against "burning out," and provides for the greatest efficiency in power development. This high-class construction places the Holsman foremost in the ranks of the auto industry of to-day.

Another feature equally distinctive is that for the first time since the inception of automobiles, the power is delivered direct from the crankshaft to the driving wheels without the use of either gears or jackshaft. The full significance of this achievement can hardly be realized, and certainly justice cannot be done to it here.

**High Wheels Travel All Roads Because All Roads Are Made To Be Traveled By High Wheels**







The Holsman is the original high-wheeled automobile. It will go where no other automobile of equal horse power can go—over the worst city streets, up any hill, over rocks, ridges or stumps, through deep mud, ruts or sand.

**EVERY PART OF EVERY MACHINE GUARANTEED**

The only high-wheeled automobile having a perfect score in a public reliability contest, and Holsman contest records date back to 1902. **Winner of the 1908 Algonquin Hill Climb—Motor Buggy Class—greatest hill climbing event in America.** Built by the oldest and largest manufacturers of high-wheeled automobiles in the world. **Annual sales over $600 000**

**The New York Automobile Show, Grand Central Palace, New York City, December 31st, 1908, to January 7th, 1909, and The Chicago Automobile Show, Coliseum, Chicago, February 6th to 13th, 1909.**

Write for interesting booklet showing photographs and giving full description of this wonderfu motor and some of the vehicles in which we have already installed it.

**THE HOLSMAN AUTOMOBILE COMPANY,** 342 Monadnock Block, CHICAGO, ILLINOIS
*Standard Manufacturers A. M. C. M. A.*

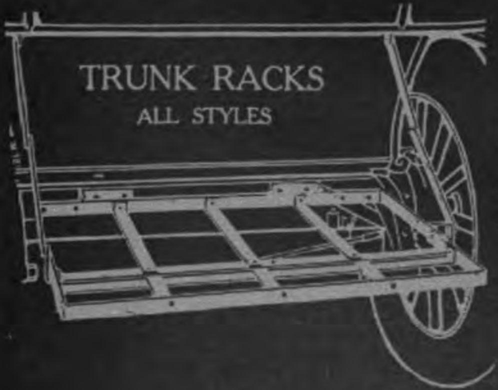
# VICTOR COMPOUND

CLUTCH AND BRAKE
VICTOR
COMPOU

MAKES A
CLUTCH-CLUTCH
AND A
BRAKE-BRAKE
TRY IT

## TRUNK RACKS

**PRICES THAT SELL THEM**


TRUNK RACKS
ALL STYLES

We are now in a position to furnish trunk racks of the most suitable material and in a variety of sizes, both single and double folding; made adjustable wherever possible. Most easily applied. Our regular finish is black enamel, baked on; other colors to order.

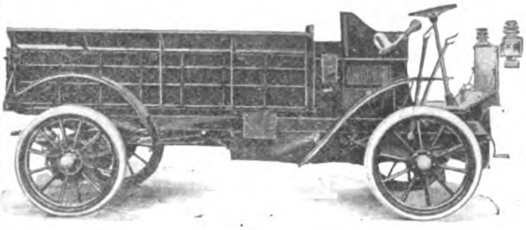
MANUFACTURED BY

Victor Clutch Compound Company
NASHUA, N. H.

# The Autocar

# Commercial Car

A standard chassis, 20 H. P., 85 inch or 97 inch wheel base, available as a one-ton truck, an open or closed delivery wagon, Taxicab, Town Car, Opera Bus, Victoria, etc. Universal utility.



**Open Delivery**

**Town Car**

Solid tires for trucks. Pneumatic for town-cars, etc.

**Economical maintenance** in fuel and up-keep.

Prompt deliveries.

*Specifications and prices on application to*

**The Autocar Co.**

**Established 1897** Ardmore, Pa. **Members: A. L. A. M.**

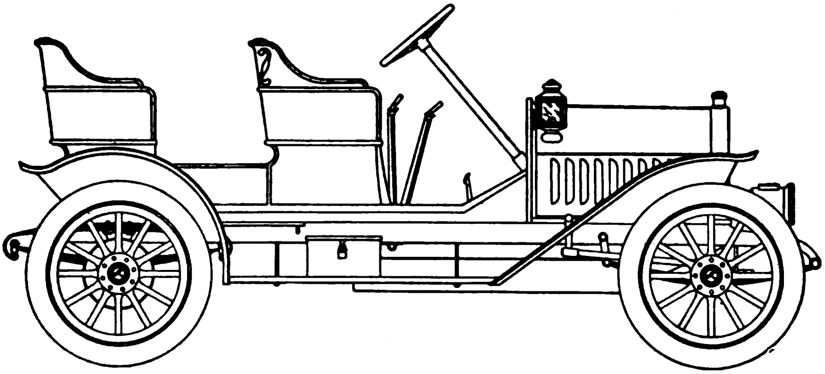
**Phila. Branch: 249 N. Broad St.**
**New York Branch: 80th St. and Broadway**

New York exhibit only at Licensed Show, Madison Square Garden, January 16, 1909.

# The Autocar

# Pleasure Car

A standardized high grade Tourabout at a moderate price. Four cylinder, four passenger---$1750.



**Type XX—1909 Tourabout**

26 horse-power (2100 lbs). Imported H. T. Magneto, front axle I Beam drop forging, semi-floating rear axle. Tires, 32 x 3½ on universal rims.

Silent—powerful.

*Deliveries in February.*

**The Autocar Co.**

**Established 1897** Ardmore, Pa. **Members: A. L. A. M.**

**Phila. Branch: 249 N. Broad St.**
**New York Branch: 80th St. and Broadway**

**New York exhibit only at Licensed Show, Madison Square Garden, January 16, 1909.**

REG. U. S. PAT. OFFICE

# SIRENO

Pat. Feb. 4, '08 ; Pat. July 28, '08
Other Patents Pending

# ANNOUNCEMENT

## For 1909
## TWO NEW MODELS

SIRENO
¼ Size
Price, $35.00

**The SIRENO Adapted for Large Cars**

**The SIRENO JUNIOR for Runabouts and Small Touring Cars**

Recent Improvements make the SIRENO more flexible in operation— **STARTING INSTANTLY** and **STOPPING** the moment the push button is released. This latter improvement (Pat. applied for) is absolutely **AUTOMATIC** and **"FOOL-PROOF."**

The SIRENO JUNIOR is a smaller type and is bound to spring into favor—operates in the same manner as the SIRENO but has not the braking feature. The volume of sound has a carrying range of one to two miles on country roads.

**Both Types Have BALL-BEARING MOTORS**

**and Operate on SIX VOLTS**

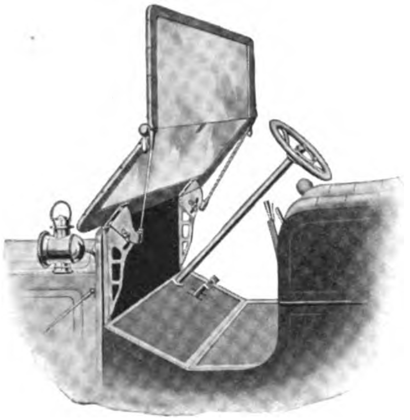
SIRENO JUNIOR
¼ Size Price, $25.00

New models exhibited at all the Shows. Get our new printed matter. Circular "J" describes these models and other accessories for 1909.
Dealers, don't fail to get quotation and cuts for your catalog. It will pay you. Address us.

*THE* **SIRENO** *COMPANY*
39-41 Cortlandt Street NEW YORK CITY

## THE BURROWES WIND SHIELD

The E. T. Burrowes Co., of Portland, Maine, well known in the automobile field as manufacturers of several specialties and world renowned as manufacturers of window screens, have added to their line of automobile specialties a folding and adjustable wind shield, which is illustrated herewith. The lower section of this wind shield may be set at an angle and therefore does not present to the wind as blunt a resistance as a vertical wind shield. Being adjustable it may be placed near the occupants of the front seat thus providing protection to the occupants of the rear seat as well as those in the front seat. As the top, when raised, extends 6 to 8 inches in front of the shield the rain cannot blow in over the top of the shield. A rain drip protects the dash preventing the rain from coming down inside.



The Burrowes Wind Shield.

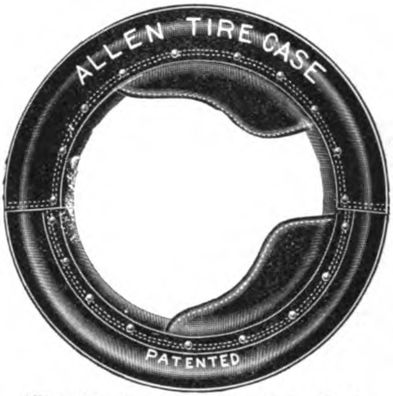
The frame of this shield can be had in either birch or mahogany. The metal parts are of brass, highly polished or of a special metal finished with several coats of baked enamel. The frame work is reinforced with metal. The finest quality plate glass is used 3-16 inches thick in the top section and ¼ inch thick in the bottom section. The edges along the dividing line are ground, rounded and polished and there is no metal strip across this line, hence there is nothing to obstruct the view of the car operator.

A rubber bumper on the lower section prevents the edges of the upper and lower section from striking and becoming chipped. The upper and lower sections overlap ½ inch making a practically rain-and-wind-proof joint. The lower section may be adjusted to various angles to suit the desire of the user. In any position it is rigidly locked and will not rattle.

With polished brass fittings the price is $60, with enameled metal fittings, $55. In a vertical position the height is 32 inches. The usual width is 42 or 46 inches, but special widths are made on order. Insect screens are furnished with this shield, at $5 extra. The insect screen is made of linen netting with neatly bound edges and is laced to rods which are fastened to stanchions screwed into bosses on the wind shield. The attaching or detaching of the insect screen takes only a minute and when not in use the screen can be rolled up and stored in a small space in the tool box.

## ALLEN SPARE WHEEL CASING

Keeping abreast of the times, the Allen Auto Specialty Co., 1931 Broadway, New York City, manufacturers of tire cases and other specialties, are including in their 1909 line a special casing for Stepney spare wheels and demountable rims. These casings are made in the usual Allen style with the addition of pockets for the projections and reinforcements of leather are provided where necessary. A spare wheel or spare tire on rim carried in this case can be held in ordinary tire holders, same as regular Clincher tires. These casings are furnished for Stepney and other emergency spare wheels at $6 each, for Fisk demountable tires, at $5 each, and for Continental, Michelin and other tires, at $4 each.



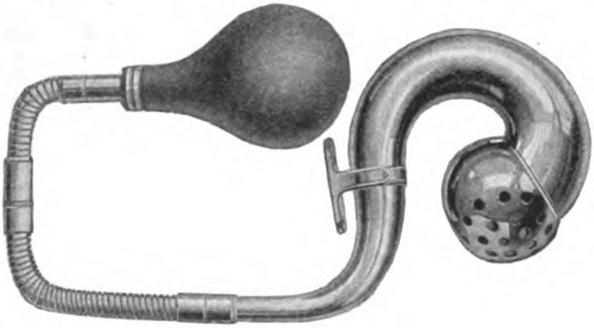
Allen Tire Case for Stepney Spare Wheel.

## "HOOSIER KNOXALL" SOAP FOR AUTOMOBILES

Hoosier Knoxall soap is manufactured by the Hoosier Mfg. Co., 372 South Illinois Street, Indianapolis, Ind. This soap is a jelly soap, made of pure linseed oil and potash, which will not injure the varnish of a car but will bring back the life and luster to the same. It is claimed to instantly dissolve and remove the crusty grease, grit and grime from the running gears, etc. The soap is also very economical to use, one tablespoonful being plenty to a twelve-quart pail of water, enough to wash a large touring car from start to finish. It also acts as a preservative for rubber and leather or pantasote upholstering and tops. It is put up in all sizes, from 5-pound patent clamp top pails listing at 75 cents, up to 500-pound barrels listing at 7 cents per pound.

## AUTOMOBILE SUPPLY MFG. CO.'S NEW HORN

The accompanying cut illustrates a new horn just brought out by Automobile Supply Mfg. Co., the well known horn manufacturers of Brooklyn, N. Y. Its most important features are its novel design, compactness and its rich, penetrating tone. The price is also said to be attractive.

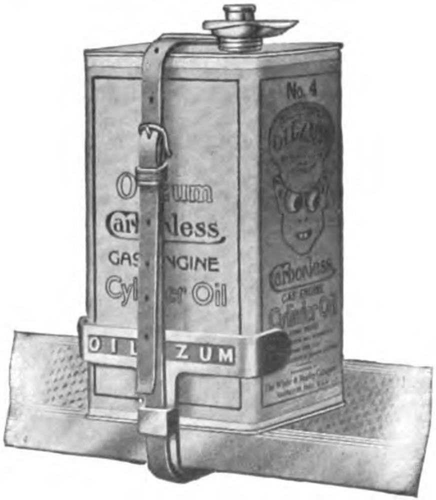


Automobile Supply Mfg. Co's. New Horn.

This company has recently added to its manufacturing facilities by taking the premises No. 220-224 Taaffe Place which with their factories at 218-220 Closson Street and at 139-147 Emerson Place gives them a total of 35,000 square feet of floor space.

## FREE OIL CAN BRACKET FOR "OILZUM" USERS

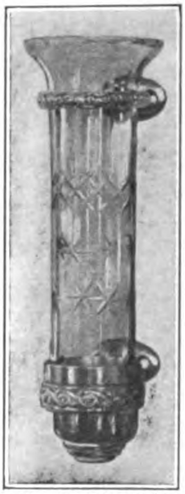
The White & Bagley Co., Worcester, Mass., are furnishing free of charge to users of their "Oilzum" cylinder oils, a handsome bracket for holding an extra can of oil on the running board of the car. This bracket is very easily attached by means of two screws in the under side of the running board. The bracket and method of holding the can by means of a strap passing over the top and down the front are clearly shown in the accompanying cut. The device is very attractive and, with the can of oil in its grip, adds to the appearance of the car.



The "Oilzum" Oil Can Bracket.

## BOUQUET HOLDER FOR LIMOUSINES THE LATEST NOVELTY

The latest novelty in the automobile specialty line is a bouquet holder for limousines and C. Cowles & Co., of New Haven, Conn., are among the first on the market with this specialty. Their bouquet holder is here illustrated. It is made of crystal cut glass and is held by brackets of silver, gold, brass or gun metal. In addition to the style here shown, they have a variety of cornucopia shaped holders, also cylindrical and other shapes. Besides plain cut glass with gold decorations, these holders are furnished in tinted glass.



Cowles Bouquet Holder.

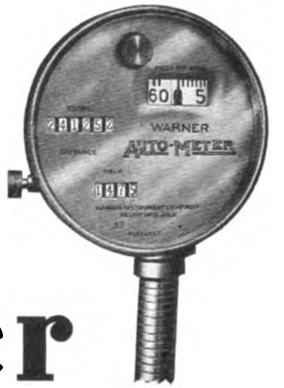
## "RADIATOR DECALCIFIER"

General Accumulator and Battery Co., 134 Second street, Milwaukee, Wis., are putting out a solution for removing lime deposits and incrustations from radiators and other parts of the circulation system. They call this preparation "Radiator Decalcifier," and it is a gelatinous substance which readily mixes with the cooling water. Combining quickly with the calcium accumulations, it dissolves them. It is said to be perfectly harmless to metals. List prices range from $12 per dozen pint cans to $30 for ½ dozen gallon cans. Sample cans are furnished at the list prices. Discounts are quoted on case lots.

This company also manufactures a preparation called "Stop-Leak" for repairing leaks in radiators, water pipes, crank cases, tanks, etc. "Stop-Leak" is a metallic powder which after being moistened into paste form will set into solid metal and amalgamate with the metal to which it is applied. Three ounce boxes list at $1, half pound boxes at $1.75, pound boxes at $2.50, and 5-pound boxes at $10. Discounts to the trade on case lots.

*The Warner Instrument Co.*
*of Beloit, Wis.*
*Announce their Masterpiece—*

# The 1909 Auto-Meter



The illustration shows the form of the new instrument. The chaste simplicity and artistic beauty of the design is self-evident. It harmonizes perfectly with other dash equipment and gives tone to any car.

The Speed Recording mechanism is unchanged. It was perfection before. Improvement was impossible.

The Odometer is now of our own construction. Therefore, as simple, durable and dependable as the Auto-Meter itself. The figures are so large and distinct that they can be read from the seat.

The Season dial registers 100,000 miles. Other odometers register 10,000 miles only.

The Trip dial registers 1,000 miles. Other odometers register 100 miles only.

The Trip dial-set is simplified. A single turn of the button resets to zero.

Those who have used any kind of Speed Indicator will realize what these points mean to them.

The entire dial is illuminated by concealed electric bulb. The pressure of a button makes speed and distance plainly readable in the darkest night.

The Shaft Drive is now made simpler and stronger than ever before. We use special steel, heat treated, in its construction. This was really not required. We have seldom had shaft or other troubles not caused by carelessness or accident. We changed simply because modern methods had produced something better than we had used before.

The Auto-Meter is constructed throughout of the best materials procurable. It is made and put together by the same workmen who are engaged in making Chronometers and other expensive instruments of precision.

The tests and inspection of each instrument is so rigid that variations from absolute accuracy are only possible when there are variations in tire diameters. This amounts, on the average, to less than 100 feet to the mile.

For these reasons the Warner Auto-Meter has always been specified by those who can afford THE BEST, and with whom anything short of absolute perfection and unfailing accuracy is of no use whatever.

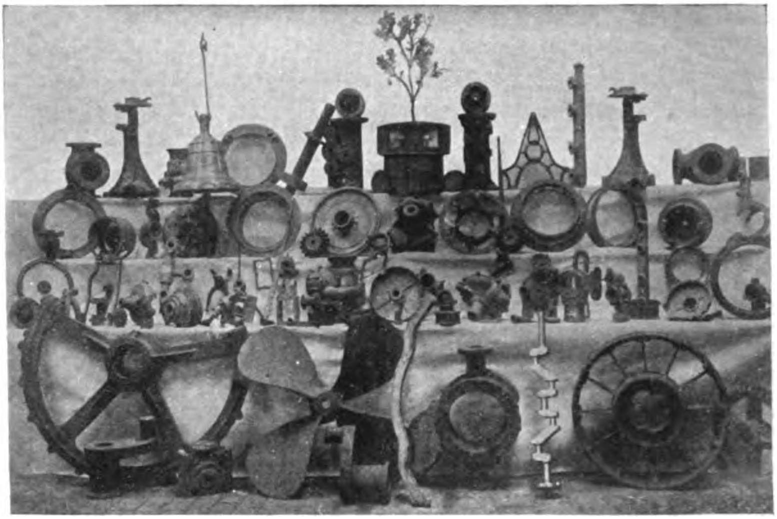
## The Warner Instrument Company

**Factory and Main Offices: 315 Wheeler Avenue, BELOIT, WIS.**

**New York, 1902 Broadway**
**Boston, 925 Boylston St.**
**Philadelphia, Cor. Broad & Race**
**Pittsburg, 5432 Forbes St.**

**Cleveland, 2062 Euclid Ave.**
**Buffalo, 722 Main St.**
**Detroit, 239 Jefferson Ave.**
**Chicago, 1305 Michigan Ave.**

**Indianapolis, 330½ N Illinois St.**
**St. Louis, 3923 Olive St.**
**San Francisco, 550 Golden Gate Ave.**
**Los Angeles, 1212 S. Main St.**



Group of steel castings of various degrees of hardness from dead soft to self-hardening produced by a German process for which Henry Hess has secured the American rights.

## HESS STEEL CASTINGS

Henry Hess, 21st and Fairmount avenue, Philadelphia, has bought the right for the North American Continent to manufacture steel castings under a German process which produces castings ranging from dead soft to self-hardening. The cut herewith illustrates a number of samples of these castings, including stock soft enuf to forge out cold (the branch of leaves in the top row center) and all ranges of hardness to high speed steel and self-hardening steel for cutters. Any specifications possible in rolled or forged stock can be realized by this process of casting any section; thick, thin, abrupt changes in cross-section from thick to thin. These castings are said to have clean surfaces with no blow holes or pits and are absolutely solid 3-32-inch below the surface. Complicated coring is practicable and safe with this process.

Arrangements have been made to deliver castings from the German works pending the establishment of a foundry here.

## THE "PARACOIL"

The "Paracoil" is a new primary coil just placed on the market by Goodson Electric & Mfg. Co., of Providence, R. I. The manufacturers have aimed to eliminate the defects commonly attributed to primary coils and to produce a perfectly proportioned coil. They have therefore used specially selected materials and enveloped these in a new type of case said to be absolutely water-proof. The coil is guaranteed to be unaffected by any degree of moisture.

A special feature of this coil is the tubular connections which eliminate binding posts, make the coil compact and capable of withstanding rough usage. The manufacturers' guarantee is printed on each coil and dealers are authorized to replace any coil that does not give perfect satisfaction.

GOODSON ELECTRIC & MANUFACTURING COMPANY
PROVIDENCE, R.I.

Goodson Special Case of 100 battery connectors and 400 wire terminals.

The Goodson Co. are just now making a special offer on battery connectors and wire terminals in order to introduce them in every garage. They are putting out a special case, as here illustrated, containing 100 connectors and 100 terminals of each of four sizes, 400 terminals altogether. The case is divided into compartments. Price, including the case, 100 connectors and 400 terminals is $4.

## SOP-O-ZON

A liquid hand cleansing compound has been placed on the market by Bobrick Chemical Co., 113-119 S. Carey Street, Los Angeles, Cal., called "Sop-O-Zon." It is put up in screw-top cans with a hole in the screw cap through which the liquid can be shaken out on the hands. This is not only convenient but it avoids waste of the liquid.

Sop-O-Zon is a carbolated, antiseptic solvent and contains no acid or grit; hence it does not injure the skin. It dissolves dirt, grime and grit from the hands or from any paint, wood, glass or metal surface. The price is 25 cents per pint, 40 cents per quart and $1.25 per gallon.

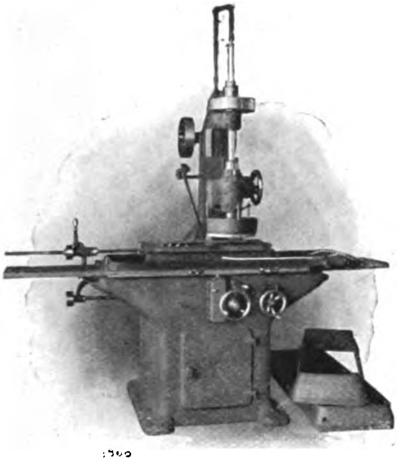
## Visit our Exhibit at the

# Madison Square Garden Show

The **P & W Vertical Surface Grinder** will grind from **12 to 20 times faster** than any surface grinder built.

Cup-shaped wheel covers full width of work, ensuring perfect flatness and rapid reduction.

*Write for Illustrated Circulars.*

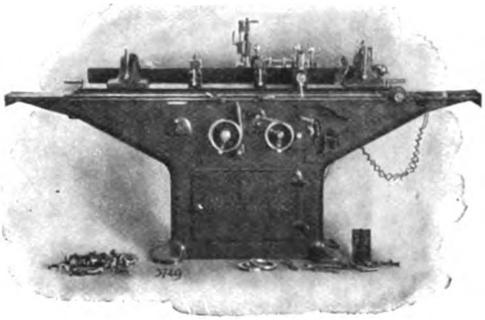


Vertical Surface Grinder

## AUTOMATIC GRINDING TO WITHIN .0001 INCH

The **P & W Sizing Grinder** grinds to size within $\frac{1}{10000}$ inch automatically. Measures faster and more accurately than a man can do it. Wear of wheel has no effect.

*Write for Illustrated Circulars.*

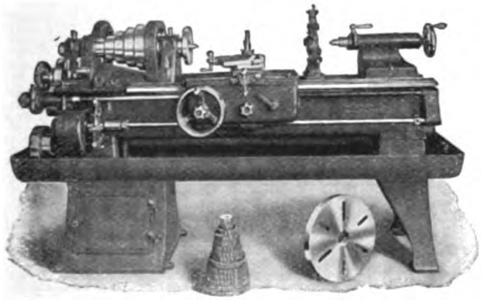


Automatic Sizing Grinder

## PRECISION LATHES

Turret Lathes, Bench Lathes with all attachments, 10-inch Toolmakers' Lathes, 14-inch Lathes, 16-inch Lathes with cone or geared head.

*Write for catalog "Lathes."*

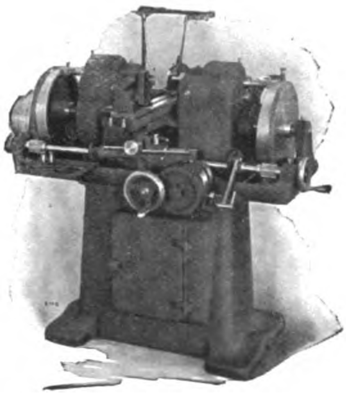


14-Inch Engine Lathe

## SLOT MILLING

The **P & W Spline Milling Machine** is an entirely new machine for milling slots with closed ends, keyways and an endless variety of other work—greatly reducing the cost of production. Machine is automatic, rapid and accurate.

*Write for catalog "The Spline Milling Machine."*



Spline Milling Machine

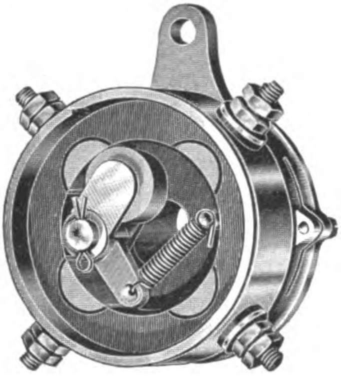
**PRATT & WHITNEY CO., HARTFORD, CONN.**

**New York Boston Philadelphia Pittsburgh Chicago London**

## NEW ZIMMERMANN TIMER

The Zimmermann-Smith Co., of 72-74 Main St., North Tonawanda, N. Y., have just placed on the market a new ball bearing primary timer which will be manufactured during 1909, in addition to their present line. One of the main features of this new timer is the use of a metal roller track in place of fibre or leather. This metal track cannot warp or change its contour from the effect of heat or dampness. The contacts and roller are made from material which will not corrode nor leave deposit on the contact surfaces. Their well known reversible roller yoke construction is retained in this timer. It can be removed at any time without disturbing the position of the timer, by simply taking off the cover and removing the cotter pin.

A single ball race is used consisting of 17 steel balls of 5-16 inches diameter. This bearing is of the four point type forming a square of resistance through the axis of rotation. Particular attention is given obtaining accuracy and its adjustments so as to form a uniform roller motion of the balls. A felt washer renders the bearing dust proof.



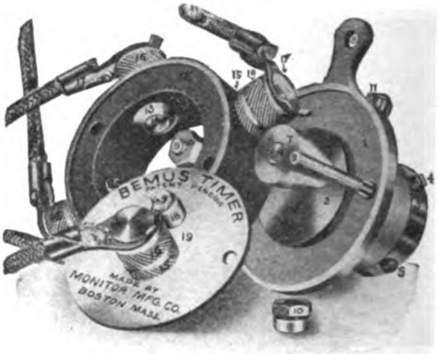
Zimmermann 1909 Ball Bearing Timer.

A snap-on cover is another feature of this timer, no nuts or screws being necessary to hold on the cover. The timer is attached as any of their other models, by slipping on a shaft and setting up two steel set screws; or it may be pinned to the shaft, if desired. The timers are bored regularly for ½-inch shaft, but may be had for 9-16, ⅝ or 11-16 inches shaft. The width across the cover is 2½ inches and the length is 2⅛ inches over all.

This company also manufactures a brass quadrant and handle for use in connection with this timer when used on motor boats or stationary engines.

## THE MONITOR PLAIN BEARING TIMER

The Monitor Manufacturing Company, of 6 Pelham Street, Boston, Mass., has recently brought out an entirely new form of primary contact maker and are applying it to the already well known "Bemus Timer." By referring to the cut it will be noticed that a beveled roll is used for the primary brush. This roll is carried by a pin located off center relative to the axis and designed to engage with steel balls. The points of the balls touch on the beveled part of the roll, causing same to turn on the pin and at the same time positively rotating the balls universally.



Monitor Plain Bearing Timer.

This timer is supplied with a ground contact of special construction and designed so that the point of contact, which is a steel ball, will engage on the end of the roll. The current is brought in through binding post No. 16 on to roll No. 7 thence to ground contact connection, which is connected to battery, engine or frame, thus avoiding the necessity of the current being obliged to travel through an oil insulated bearing. All of the ball contacts are easily removed and cheaply renewed, being standard ⅜-inch steel balls. They may be obtained almost anywhere and the roll or primary brush can also easily be renewed at an expense of 25 cents or less, making an expenditure of not more than 40 cents on a four cylinder timer.

This form of contact has been thoroughly tested. The timer has been run equivalent to 35,000 miles without its being necessary to renew either the roll or balls.

The manufacturers will be pleased to forward descriptive booklet and price list upon request.

---

James Cunningham, Son & Co., of Rochester, N. Y., who have been engaged in the manufacture of carriage bodies for a number of years, have installed equipment in their factory for the production of automobile bodies for the trade. This concern has one of the largest body factories devoted exclusively to heavy work and it is especially equipped for building limousines, landaulets, taxicabs and similar bodies. They contemplate marketing next year motor ambulances, casket wagons and taxicabs.

**Everything for Automobile**
**DEALERS AND OWNERS**

We are Manufacturers' Agents and Distributors, Manufacturers, Importers, Jobbers and Wholesalers of

**Automobile Supplies, Materials**
**Accessories, and Tools**

Western Distributors of **CONTINENTAL TIRES** Best by Every Test

We Give Your Orders

**Careful and Accurate Shipment**
**Prices that are Right**
**Prompt and Courteous Attention**

**Excelsior Supply Co.**

Send for Catalogue "AA"

Established 1876 ***CHICAGO, ILL.***

233-235-237 RANDOLPH ST.

# What More Do You Want That You Don't Get in This Car—Price $1500

If you ever owned a car you can appreciate this Mitchell 30 at $1500.

It's not hard to convince an "automobile-wise" man that in this car you get a greater value than in any other car at even a greater price.

And if you are now "investigating the automobile market" for the first time read this advertisement.

It will show you that $1500 is all you need pay for a car that will fill every requirement you have for a five-passenger automobile and incidentally save you from $500 to $2000.

This Mitchell 30 is not a sensation.

Sensations cease to be sensations when they become practical everyday happenings.

The Mitchell is not the result of a new discovery that a "good" automobile can "probably" be made to sell at $1500. The Mitchell is a development — not a discovery—of eight years automobile building.

It has always been a low price high-quality car.

Therefore the Mitchell 30 will not be found to be weak or constructionally wrong before the season is over, necessitating a change in either design or material.

There won't be any necessity to rebuild the Mitchell motor because of insufficient crank shaft bearings, too small valve openings, not sufficient cooling surface or for any other reason.

The Mitchell 30 motor has been in use on thousands of cars—all Mitchells'—for four years.

There is no longer any need for experimenting.

Can you trust the theoretical, but undemonstrated idea of even the greatest gas engine builder?

Your money goes into the car. You are the one to be inconvenienced by a broken crank shaft because there were only two bearings instead of five as on the Mitchell. Good designers must experiment before they arrive at perfection. We did that years ago. We began making low-price automobiles when we started. Eight years experimenting are back of the Mitchell. You won't have to experiment for us. It's impossible to say what might happen if you drove a theoretically-right car that has not shown its worth on the road.

No one knows what an automobile will do until it's tried.

We drove a car 110,000 miles before we discovered that the gas-pipe torsion rods used on most cars, regardless of price, should be replaced by solid steel.

That's just an instance.

A broken torsion rod might be unpleasant —even dangerous, but unless the break happened while running fast it wouldn't be so bad.

But suppose you started up-hill on "high" and couldn't make it. A two-bearing crank shaft might snap. It takes time and costs a lot to fix a broken crank shaft.

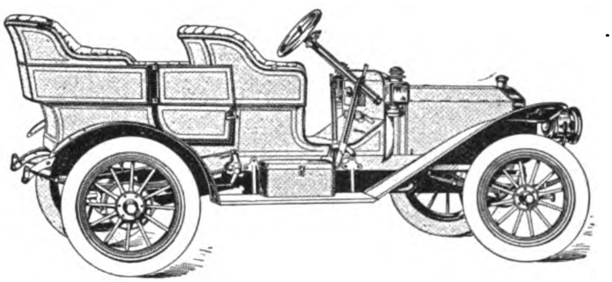
Other makers are experimenting upon nearly all parts of their cars for they are now in their first year of experience in the building of low-priced cars.

You probably know a Mitchell owner. There are 8000 of them.

They are our demonstrators. They know more about Mitchell cars than our agents. Ask an owner to tell you about the Mitchell. Then you'll know.

That's better than what any maker thinks about his car.

# Here Are a Few of the Details



Take one example of the difference between the proven Mitchell and any other car.

The best motor car theory is that the water pump should be driven at half the speed of the engine.

We made Mitchell water pumps that way at first—eight years ago.

But when the Mitchell got in common use on the deserts of Nevada, there was trouble with hot cylinders

On those boiling desert sands, where the water heats while the car is standing still, it takes more to cool a car than it does on the boulevards of Chicago.

So we made a radical change from the "best motor car practice"—we forsook the kind of knowledge on which "paper" cars are built—and we doubled the speed of the water pump.

Since we geared the water pumps to go at full engine speed, there has been no more trouble with heated cylinders—even on the hottest days and in the deepest sands that the deserts of Nevada know.

And the result is that there are only two cars which today are in common, successful use on those desert sands—one a car that costs more than three times the Mitchell price—the other, of course, the Mitchell.

• • •

You may not want a car for desert riding. You may not want a car for mountain climbing. But you can be sure of a car when it stands such tests as these.

• • •

And as with the water pump and the crank shaft, so with the transmission, so with the clutch, so with the rear axle, so with the lubrication, so with the brakes, so with every part of the Mitchell car.

• • •

In the Mitchell you will find perfections, refinements, superiorities of the kind that come only with experience—perfections, refinements, superiorities that no "paper" car, no matter how skilled its maker, can possibly have.

• • •

But if the makers of other cars knew all these vital things which eight years of experience in building low-priced cars have taught us—they would not, even then, make so good a car as the Mitchell at $1500.

The cost of making the special dies and tools, alone, would prohibit it.

If we had to begin at the beginning, as they do, this new Mitchell 30 would cost you $1000 more.

It is only because our dies special tools and initial expenses were paid for and charged off, years ago, that we can give so good a car for so small a price.

The $1500 you pay for a Mitchell 30 goes not into dies and special tools—it goes into material, workmanship, testing—it goes into the car you get.

• • •

It is not enough for us to know that our design is right, that our material is perfect, that our workmanship is of the best.

It is not enough for us to know that the 8000 cars that we have made are right.

We must know that the particular car you buy is right.

So we test it as though we were making a car a year, instead of fifteen cars a day.

## Mitchell

**New Model 30 (1909 model) including High-Grade Magneto—32x4 in. tires—assuring freedom from tire troubles and $300 worth of actual extra Automobile value which you can get in no other car of its price. Touring Car or Roadster—price,**

## $1500

We test it on the roughest roads of eastern Wisconsin—we give it actual road punishment of from 100 to 250 miles—over hills—through sand—on straight stretches—the kind of a test you would give it if you were testing it yourself.

• • •

Compare this four-cylinder, five-passenger $1500 Mitchell with any car—with the best American cars, no matter what their cost or pretensions.

You will not find in any of them more vanadium and nickel steel. You will not find more perfect engines. You will not find a proven superiority which this $1500 Mitchell lacks.

This $1500 Mitchell is an imposing looking car.

It has a wheel base of 105 inches. The body is wholly of metal. The upholstering is luxurious. The wheels are big—32 inches—fitted with detachable rims and four-inch tires.

The engine is housed under a big handsome hood. The four cylinders are cast separately, as the best engines always are. 28-30 horse-power.

Aluminum castings are employed wherever possible—only we go to the trouble and expense of strengthening them with bronze where there is wear and strain.

There are two complete ignition systems—the magneto, geared direct to the engine and a regular battery system.

The lubricating system is the best that we have found in eight years of experience—certain in operation—economical in oil.

The transmission is of the selective sliding gear type—as in $5000 to $7000 cars.

The battery and tool boxes, made of baked enamel steel, are furnished without extra expense to you.

The tonneau is detachable—and you have your choice of either tonneau, surrey body, rumble seat roadster, or runabout deck at the $1500 price.

Complete specifications and photographs of the working parts will be gladly sent.

Don't buy any car till you know all about this wonderful $1500 Mitchell 30. Please use the coupon.

**Will exhibit in New York only at Grand Central Palace Auto Show opening New Year's Eve.**

**MITCHELL MOTOR CAR CO.**
**503 Mitchell St., Racine, Wis.**
*Standard Manufacturers, A. M. C. M. A.*

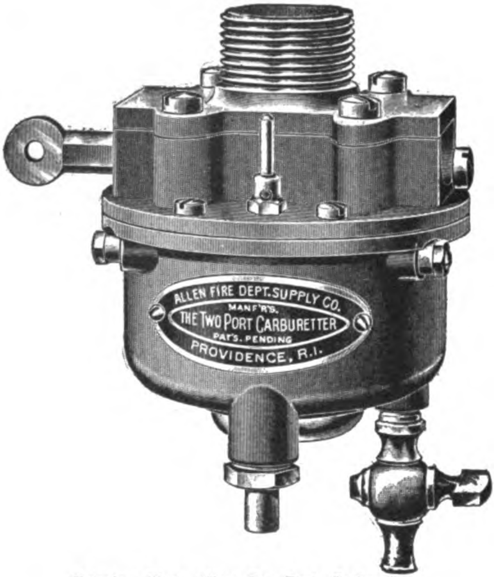
You may send me a detailed description of your new $1500 Mitchell 30.

*Name* ________________________

*Address* ________________________

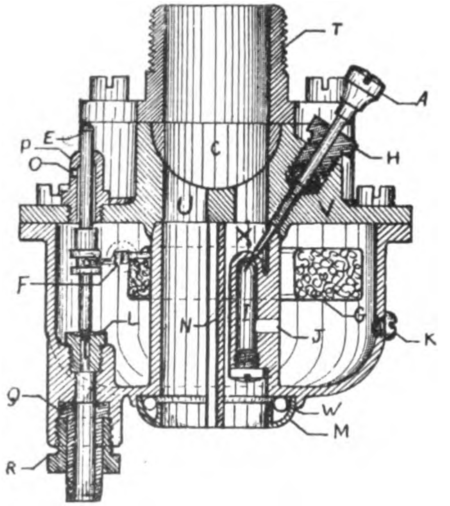
## A CARBURETOR WITHOUT VALVES

Allen Fire Department Supply Co., Eddy and Friendship streets, Providence, R. I., have brought out a carburetor with several distinctive features which tend toward simplicity and strength.



Exterior View Allen Two-Port Carburetor.

This carburetor is of compact design, float-feed type, and consists of two ports, (N) an auxiliary air port and (X) the carburetor port which contains the gasoline stack (I). Each of these ports is free, not having any valves whatsoever. The air is taken in at the bottom, one side having thick mixtures, the other side being auxiliary air and at the point near (C) form the necessary mixture of proper proportions to meet the requirement of the engine. It will be noticed that there are no butterfly valves or springs whatsoever. A slide at the top after it has been set is positive and remains in that way at all times.



Sectional View Allen Two-Port Carburetor; the carburetor port X contains the gasoline stack and the other port, N, is an auxiliary air port, both ports are free and contain no valves.

The float in the bowl is hung on a pivoted arrangement so that one gasoline level will be maintained at all times.

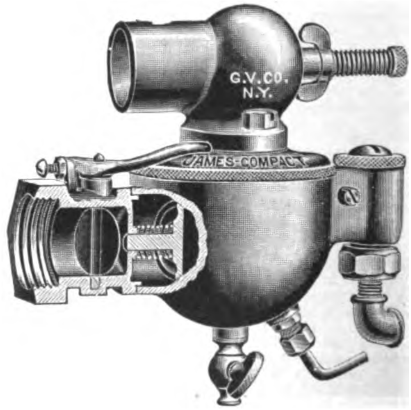
The needle (A) is made of German Silver with a German Silver seat. There are proper arrangements made for drawing off all sediment or dirt that may collect in all parts of the carburetor. At the bottom of the carburetor is a reservoir and the gasoline that is retained therein serves in starting the engine.

The sectional cut displays most of the features of this carburetor. A is the gasoline needle; C, the throttle hole; E, the float needle; F, the float lever; G, the float; H, packing gland; I, gasoline stack; J, gasoline inlet from chamber; K, screw plug for cleaning; L, seat of the float needle; M, gasoline puddle ring; N, auxiliary air port; O, air vent; P, float needle bushing; Q, swivel nipple; R, lock nipple; T, connecting screw; W, auxiliary port in cover; V, cover; W, spiral spring; X, carburetor port.

## "JAMES-COMPACT" CARBURETOR

The "James-Compact" float feed carburetor is one of the latest products of the Generator Valve Co., of 294 Taaffe Place, Brooklyn, N. Y., and is, we are told, meeting with much favor in the trade. The list prices range from $13.75 for the ¾-in. size to $26 for the 1½-in. size. Special prices are quoted to engine builders for quantities.

This carburetor has the check valve inside of the body near the gasoline nozzle so that when the mixture is formed at that point there never can be any waste of same before check valve opens. The check valve is made of a special bronze metal which will stand the hardest of wear, and can be easily taken out and reground by unscrewing the bolts which connect the carburetor to shank for engine connection.



The "James-Compact" Carburetor.

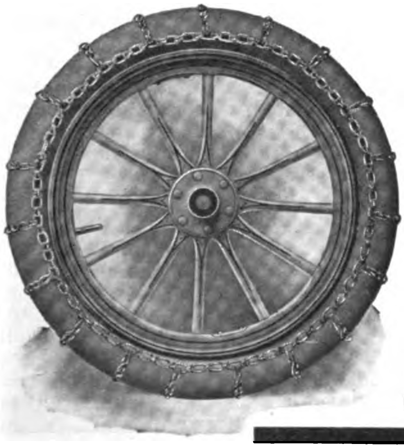
# WEED

## CHAIN TIRE GRIPS

### Positively Prevent Skidding

They grip and hold the road wheels in mud and sand without injury to the road. All possibility of slipping or skidding on wet or greasy pavements is eliminated. They preserve tires and enable **the heaviest** automobile to climb hills easily. They reduce gasolene consumption by preventing lost traction. Fit any standard tire; are easily attached and detached.

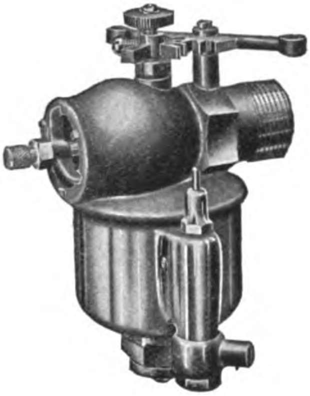
*We exhibit at the Grand Central Palace, January 1st, and Madison Square Garden, January 16th.*



**Weed Chain Tire Grip Company**
**33 Moore St., New York**

## HEITGER MODEL C CARBURETOR

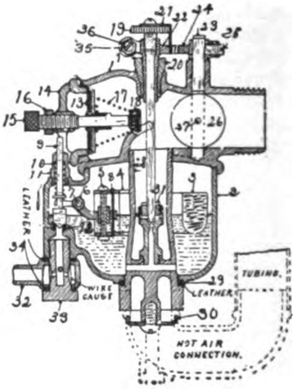
For 1909 Heitger Carburetor Co., 203 W. South street, Indianapolis, Ind., are offering their Model C carburetor which retains all the principal features of their former models, but these are improved and new and tried features added for 1909. This model has a mechanical control over the gasoline feed so that the gasoline is positively fed according to throttle opening and air admission. The throttle lever has a segment of a gear (23), integral with it, meshing into a similar one (22). This segment has a long shank threaded into the nut (20). The gasoline adjusting stem (19) is threaded into the segment (22). The lower end of stem (19) is tapered to act upon the small feed hole in spray nozzle (31) and controls the feed of gasoline into the mixing chamber. The lower end of stem (19) is supported, and held centrally by the hole in the upper end of the spray nozzle. As the gear segments (22), (23) convey a rotary motion to the threaded part of segment (22) as throttle is opened or closed, this gives an up and down motion to the stem (19), thereby feeding more or less gasoline, according to throttle position, feeding the maximum when throttle is wide open, and minimum when nearly closed.


Exterior view Heitger Model C, 1909 Carburetor.

The nut (20) is split, and has a tapered head and seat, so that it can be screwed down to take up the wear or looseness in the threads on shank of gear (22). This does not alter the adjustment of the gasoline, as the threads are same pitch inside and out. The spray nozzle (31) at its top has a narrow circular or ring shaped opening, of large circumference, for the passing air to act upon, bringing the air in intimate contact with the gasoline, causing them to readily mix. This ring-shaped gasoline outlet is very narrow and deep so that as its bottom walls are wetted with gasoline it will creep to the top by capillary attraction, making a high level in the nozzle, though the level be considerably lower in the float chamber. This makes smooth running on rough roads, and easy starting by the crank.

The float is of cork, weighted by the plates (4) to permit using a rather stiff spring for closing the float valve, reducing leaking to a minimum. The float is adjusted in height by the screw (5) which is threaded into the float lever (6) and works free in supporting plates (4). Screwing to right or left raises or lowers the float, the float always lying in a straight horizontal position, when closed, whether adjusted high or low. The float is held in a central position to prevent friction by the guide pin (8) upon which float lever (6) slides.

The gasoline connection (32) is made for tubing or ⅛-inch pipe, and swivels to any position for attaching line pipe. This connection has a pocket in it to catch and retain dirt, as the screw (33) has a wire gauge strainer of large area around its circumference to catch the dirt. The joints on the gasoline connection are made tight by gaskets.



Sectional view Heitger Model C, 1909 Carburetor.

The air valve (13) is of leather, stiffened by a brass washer, and has bronze spring adjusted by the screw (15). The cup (30) is for holding a quantity of gasoline when the carburetor is flushed as in starting in cold weather. A hot air connection is furnished as shown in cut, when desired; this fits on in place of cup (30).

The motorcycle type is nickel-plated. Special types are also made for Buick and Ford runabouts.

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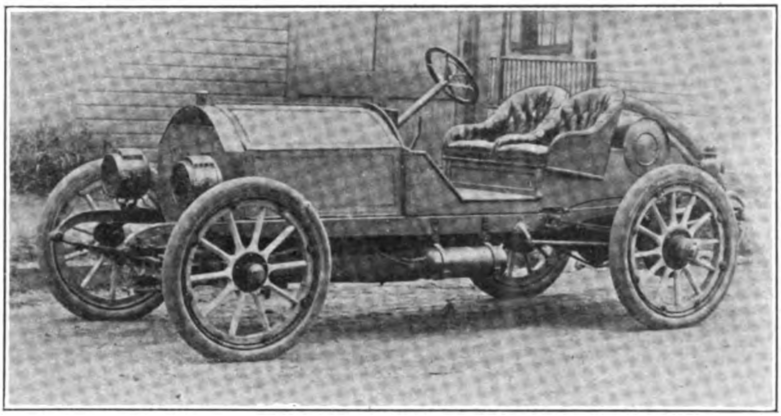
Gilbert Mfg. Co., the well-known makers of fabric specialties of New Haven, Conn., are now making a racing cap or bonnet which protects the face and head while driving at speed. This company has also added to its line a new gas tank key which is made with a bottle opener at one end. It is finished in nickel plate.

Trenton Rubber Mfg. Co., Trenton, N. J., have opened an office and salesroom at 1997 Broadway, N. Y. This has been made necessary by the rapid growth of their business especially on inner tubes and Thermoid brake lining. The latter is carried in stock in most of the large cities to insure prompt deliveries.

# THE "SHARP ARROW'S"



## SUSTAINED SPEED RECORD

### Averaging a Mile in 1 Minute, 4 Seconds for 188 Miles

AN ACKNOWLEDGED AUTOMOBILE ACHIEVEMENT *sui generis*, the fastest time yet made by an American-built machine, declared by press reports to be "the one big surprise of the race," and "the sensation of the races,"—the Vanderbilt Motor Parkway Sweepstake Races—WAS NOT AN ACCIDENT.

The Garden City event was won on merit by the steady, consistent road work of "SHARP ARROW." One news account said: "This car went along at a sixty-mile rate until Mr. Sharp saw that he was distancing his field and took it easy." It was in reality a marvelous feat. "SHARP ARROW" made a new sustained speed record for American cars on its first attempt, beating the next best car in its own class by 50 minutes, beating the entire class above by 15 minutes, and beating all but the two fastest foreign cars, the ISOTTA and RENAULT, in the highest class, cars selling for over $4,000. No wonder that the amazed contestants protested the car, and claimed that it was out of its class—"a car with $6,000 machinery in a cheap body." It certainly behaved like a high-priced machine, and kept the pace set by the fastest company with comparative ease. BUT here are—

**The Identical Specifications (plus the Personality of Wm. H. Sharp) of the 1908 "Sharp Arrow" that won the Garden City Sweepstakes, and of every 1909 car that we shall put out:**

### SPECIFICATIONS FOR RUNABOUT

Wheel base—106 inches.
Tread—56 inches.
Tires—36 x 3½ in. front; 36 x 4 in. rear.
Rims—Michelin quick detachable or plain clincher.
Springs—Half-elliptic; 38 inches front, 54 inches rear.
Frame—Pressed steel raised over rear axle, allowing low center of gravity.
Horse Power—40. Four cylinders, 5 x 5 in., cast in pairs.
Valves—All on one side.
Ignition—Jump spark; two distinct systems Connecticut coil with battery and $150 Bosch magneto.
Carburetor—Single jet automatic; water jacketed.
Lubrication—Constant level, force feed, splash system.
Motor Control—Spark and throttle on the steering wheel.
Clutch—Leather cone, large diameter.
Gears—Chrome nickel steel, mounted on Hess-Bright annular ball bearings.
Speeds—Three forward and reverse.
Change Gear Control—Selective.
Drive—Shaft and bevel gear.
Rear Axle—Full floating clutch type with D. W. F. annular ball bearings.
Front Axle—One piece I beam drop forged; cross steering link back of axle.
Brakes—Transmission brake is operated by foot pedal; internal hub brakes are operated by the hand brake through a long equalizing bar.
Radiator—Honey comb.
Gasoline Tank—Copper.
Shock Absorbers—Truffault-Hartford, full set of four.
Lamps—Three oil lamps, two 8-inch Solar gas lamps with Prest-O-Lite tank.
Weight—2100 lbs., tanks empty.
Speed—Over 70 miles an hour road gear.

### SPECIFICATIONS FOR TOURING CAR

Same as runabout, excepting—
Wheelbase—116 inches.
Tires—36 x 4 inches, front and rear.
Weight—2,300 pounds.
Speed—60 miles an hour.

THE 106-INCH WHEEL BASE CHASSIS will be equipped with three styles of bodies:

TWO-PASSENGER BODY with cylindrical gasoline tank back of seats, $2,750.00

TWO-PASSENGER BODY with tank under seats and luggage compartment in rear, $2,750.00.

TWO-PASSENGER BODY, admitting of one or two rumble seats, $2,750.00.

THE 116-INCH WHEEL BASE CHASSIS will be equipped with two styles of bodies:

FOUR-PASSENGER TOY TONNEAU, $2,850.00.

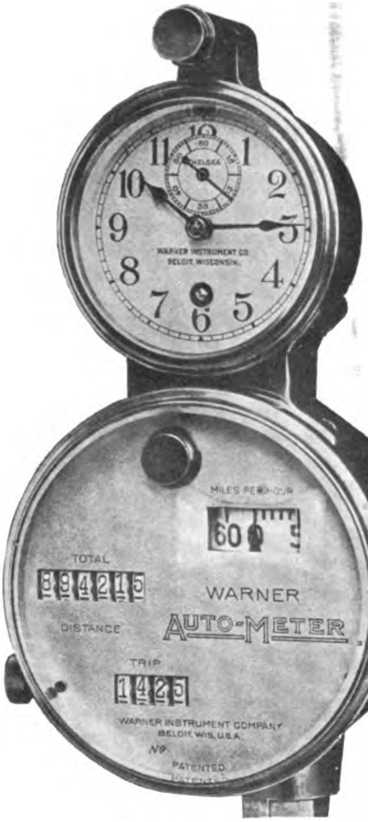
5-PASSENGER TOURING CAR, $2,850.00.

*Catalogues on Application*

**Offices and Factory - TRENTON, N. J.**

## 1909 WARNER AUTOMETER

The Warner Instrument Co., of Beloit, Wis., have made some improvements in their "Autometer" for 1909, and we are showing herewith the new model. One of the most notable changes in this instrument is the new odometer with the 100,000 mile season and 1,000 mile trip register and the simple trip reset device. Another important improvement is in the new shaft and drive. In the 1909 instrument the shaft will make half as many revolutions as in the old model. Each instrument is fitted with an enclosed electric light. The principle of operation has not been changed.



1909 Warner Autometer.

The Warner Co. are now ready to make deliveries of the new model.

## NOBLES & HOARE'S ENGLISH VARNISHES

Pomeroy & Fischer, 28-32 Frankfort St., New York City, are sole agents in the United States for Nobles & Hoare's English varnishes and Walkers, Parker & Co's English white lead, etc. They are also importers of colors in japan, oil and dry. Nobles & Hoare exercise great care in the production of their varnishes making sure that all varnish is properly aged. They have on hand in process of aging about a half million gallons of varnish at all times. This is kept on hand month after month until it has reached the proper state of maturity. This care is necessary, they claim, to produce a durable finishing varnish for automobile body work.

## NEW JONES MODERATE-PRICED SPEEDOMETERS

The Jones Speedometer, 76th Street and Broadway, New York City, has placed on the market four new models in order to meet the demand for a speedometer commensurate in price with cars of medium cost. The lowest priced instrument is fitted with a 50-mile speed scale and lists for $15.00.

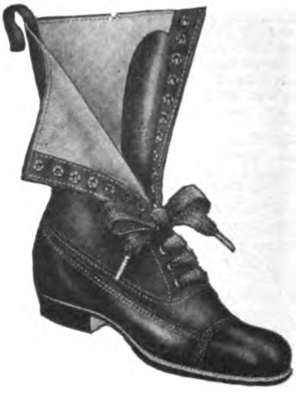
Model 22 has Veeder season odometer 50-mile speed scale and costs five dollars more than Model 30.

Model 27 indicates speed to 50 miles per hour and records season mileage with Jones Enclosed Odometer.

Model 28 has the Jones trip odometer with its feature of recording cumulative mileage.

## THE "AUTO-FELT" BOOT

The "Auto-Felt" Boot is a cold weather boot gotten out especially for the use of motorists by A. H. Putnam & Co., of Danvers, Mass. This boot is made with a felt upper foxed with leather and has a heavy felt lining. It is 10 inches high and is made in sizes from 6 to 12. The price is $4 per pair. It may be obtained from accessory dealers or direct from the manufacturers at this price.



The "Auto-Felt" Boot.

Royal Equipment Co., 151 Housatonic Avenue, Bridgeport, Conn., have added the sub-title "friction facing" to their "Raybestos," a composite asbestos and copper wire fabric for brake and clutch linings. As this lining is said to have proved an exceptional friction creator the change in its name is deemed advisable by the manufacturers as tending to bring this important feature into prominence.

THE "FIRESTONE" CLINCHER TIRE. MFD. BY FIRESTONE TIRE AND RUBBER CO AKRON O 34 × 4

# YOUR NEW CAR—

The service and satisfaction it will give you will depend largely upon its tires.

Without any more expense to you than ordinary tires, you may have your auto come equipped with "FIRESTONE" Pneumatic Tires if you specify them at the time of purchase.

Owing to their greater manufacturing cost, they command a little higher price than any other tires, but they add so much to the serviceability of the car that it will be decidedly in your own interest to **firmly insist upon**

## FIRESTONE TIRES

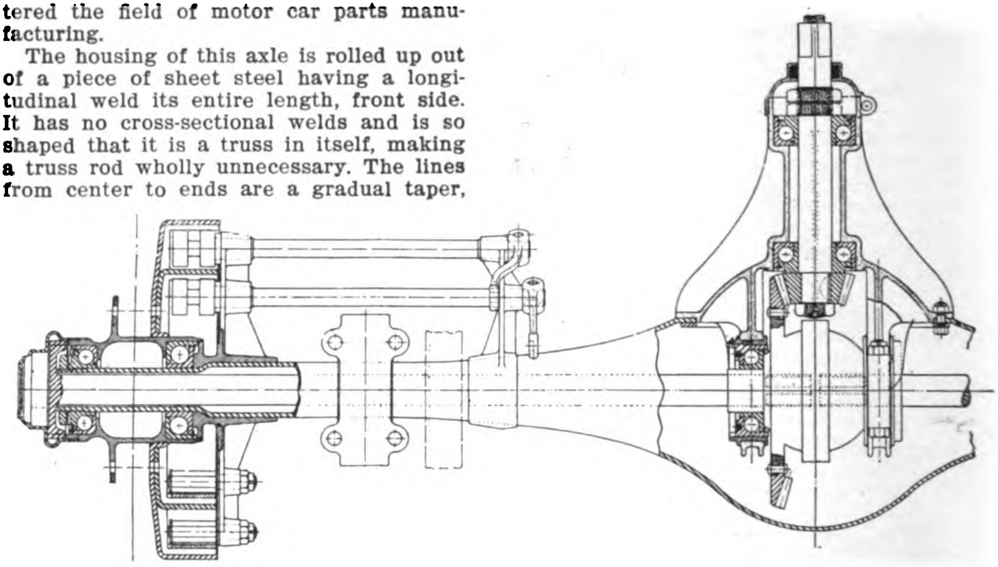
**FIRESTONE TIRE & RUBBER CO.**
**AKRON, OHIO**

*The largest exclusive rubber tire makers in America*

## McCUE REAR AXLE

The accompanying line cut illustrates the McCue rear axle made by The McCue Co., of Hartford, Conn., who recently entered the field of motor car parts manufacturing.

The housing of this axle is rolled up out of a piece of sheet steel having a longitudinal weld its entire length, front side. It has no cross-sectional welds and is so shaped that it is a truss in itself, making a truss rod wholly unnecessary. The lines from center to ends are a gradual taper, presenting a symmetrical appearance.



McCue Rear Axle.

The longitudinal weld is made by the autogenous process which is said to be from 75 to 90 per cent. as strong as the solid metal. This housing is similar in construction and manufacture to a rolled tube and is strong enough so far as carrying capacity is concerned to use without welding, as it is firmly held to shape by the brake spiders, spring seats and brake rod brackets, but to make it perfectly oil tight it is necessary to weld it.

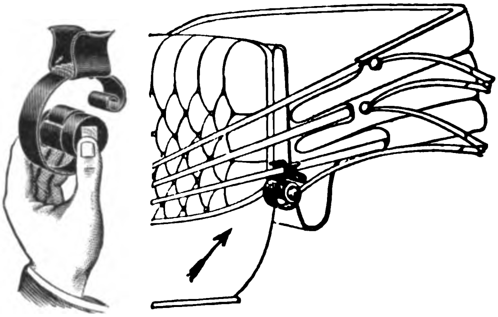
Aside from the new housing the McCue axle has some other very commendable features. The floating axles are integral with the hub clutches. These driving shafts are made of .45 carbon steel. The clutches are correctly milled, hardened and engage the outer ends of hubs close up to the bearings, making their grip positive, with no tendency to twist, and at the same time permitting the hub end to be covered with a neat short hub cap.

The differential has bevel pinion gears and is securely held in place to the gear case cover, the latter being securely held to the axle housing by twelve bolts. The gear case cover is made with six ribs and with or without torsion rod brackets.

Large ball bearings are used thruout, having ample carrying and thrust capacity. The brake drums are pressed steel, 10 and 14 inches. The brakes are expanding, both having asbestos lining. The foot pedal can be connected to the large drum, giving the maximum wearing and braking surface to the brake which is constantly used. The brake rods extend inside of the frame, permitting the connections being made under the car and doing away with long, vibrating brake rods running along the side of the car.

## LAKE'S TOP SUPPORT

A top support, designed also to prevent damage to the top by excessive bumping, has been placed on the market by The Lake Bros.—Barbee Mfg. Co., 1401-1405 W. 9th Street, Cleveland, Ohio. As will be seen from the accompanying cut it comprises a bow rest held on a bracket consisting of spiral spring of flat steel. The bow rest is leather lined to prevent chafing of the bows and is formed so as to clamp the bow in its grasp. The spiral spring absorbs the road shocks and prevents excessive bouncing of the top.



Lake's Top Support.

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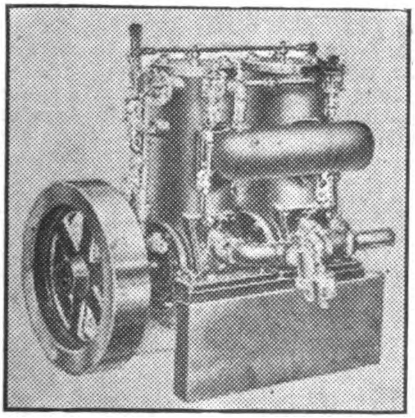
The Carrie A. George Co., of Nazareth, Pa., has recently placed on the market a veil shield, which is designed to prevent the unpleasantness of a frozen veil coming in contact with the nose and mouth, chapping the lips and making it almost impossible to breathe. By means of this shield all this trouble is obviated. The veil will remain clean and the hands can be kept under cover.

## THE BRIGHAM MARINE MOTOR

This well-known 2-cycle motor has been on the market for seven years, and is now being manufactured by the firm of Keeble & Scott, 313 Methuen St., Lawrence, Mass., this firm having purchased the jigs, patterns, fixtures and good-will of the business from the former owners and manufacturers, The Brigham Marine Motor Co., of Boston, Mass. This motor is made in four sizes, 4, 6, 8, and 12 H. P., the first two being single cylinder units, and the last two double cylinder units.

All sizes are regularly equipped with standard vaporizing valves, or can be furnished with any make of carburetor at the option of the customer at slight extra cost. When equipped with carburetor, a check valve is included without extra cost, taking the place of the mixing valve or vaporizer. As will be seen the engines are regularly sent out 2-ports, but 3-port engines can be furnished at the same price in the same sizes. The regular ignition equipment is make and break, but jump spark ignition can be furnished if desired.



The Brigham 2-Cycle Marine Motor, 2-cylinder model.

One of the special features of the Brigham motor is its extremely long bearings made of the highest grade of bronze and fitted with extreme nicety. If kept properly lubricated the wear is extremely light, allowing no leakage of gas from the crank-case. An extra long piston is used with packing-rings at top and bottom to assure uniform wear and render reboring unnecessary except at very long intervals.

The long connecting-rod (10½ ins.) together with the long stroke (5 in. on the 4 and 8 H. P. and 5¼ ins. on the 6 and 12 H. P.) also assist in reducing the wear between the cylinder and piston, as the angle which the connecting-rod makes with the vertical line is never large.

The fly-wheel is extra heavy, in order that the engine may run steadily in rough seas. Cooling is by plunger pump, one being furnished for each cylinder. The cylinders and the heads are thoroughly water-jacketed.

By an ingenious arrangement of the make and break mechanism, the natural wear and corrosion of the sparking points has been overcome, and an adjustment is secured which permits of running the engine the entire season without renewing the points. A spark advancer is furnished, which permits the operator to vary the speed through a wide range merely by advancing or retarding the spark, without touching the throttle. This feature adds largely to the gasoline economy of the engine, besides being a great help in reversing.

The engine delivers its rated horse power at the very low running speed of 450-500 revs. per minute which assures long life to all moving parts by reducing wear to a minimum.

The Brigham is a "heavy-duty" engine. While many have been sold to pleasure-boat owners desiring a thoroughly reliable engine, still more have been sold to fishermen, lobstermen and others whose livelihood depends upon their boats, and to whom the question of reliability is naturally of the highest importance.

Brigham engines are guaranteed against defects in material or manufacture for the period of one year from date of shipment.

The standard finish of Brigham motors is red, but different colors will be furnished at option of customer, if notice is given when order is placed.

The engines list as follows including generator valve or vaporizer, ball-thrust bearing, shaft-coupling, oil and grease cups, propeller shaft, solid propeller, stuffing-box, batteries, switch, coil and muffler: 4 H. P. size, $125; 6 H. P., $160; 8 H. P., $275; 12 H. P., $380.

Engines only, including vaporizer with throttle, oil and grease cups, thrust bearing and muffler, list as follows: 4 H. P., $100; 6 H. P., $130; 8 H. P., $240; 12 H. P., $330.

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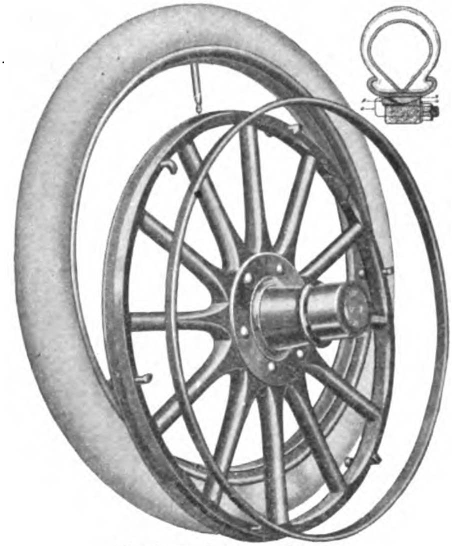
The Locomobile Company of America is now comfortably installed in its new Boston Branch, at 589 Boylston Street, opposite the famous Public Library, and the Museum of Natural History.

The Automobile and Machinery Company, Atlanta, Ga., agents for the State for the Oldsmobile and accessories and supplies have recently opened an attractive office and salesroom at 34 Auburn Avenue, Atlanta.

H. K. Sheridan, who has driven the White Steamer to victory in a number of important reliability runs, including the contest for the Hower trophy in 1907 and the Quaker City Motor Club contest of last January, has accepted an offer from Manager George W. Bennett to become superintendent of the New York branch, and he will hereafter be in charge of the garage and repair shop.

## SAGER DEMOUNTABLE RIM

To provide a demountable rim simple and strong, without a multiplicity of parts, and one that can be quickly attached or detached, has been the aim of the J. H. Sager Co., Rochester, N. Y., in designing the rim here illustrated. Any ordinary clincher rim is used. The band marked (b) in the cut, which has two beveled surfaces extending outward, is securely riveted to the tire rim. A rim (c) having one beveled surface extending inward is shrunk and otherwise secured to the felloe of the wheel. The only loose part is the beveled ring (a). It is not necessary to remove the hook bolts (d), but simply turn them out of engagement when the nuts are loosened. To assemble, simply place the rim containing an inflated tire on the wheel until the beveled surfaces come together, then slip the loose beveled ring in place, turn up the hooked bolts and tighten up the nuts. It can be attached or detached in less than 30 seconds. The other cut accompanying this article shows clearly how simple is the attachment of Sager Equalizing Springs. It illustrates the rear attachment to a car having pressed steel frame.



The Sager Demountable Rim.

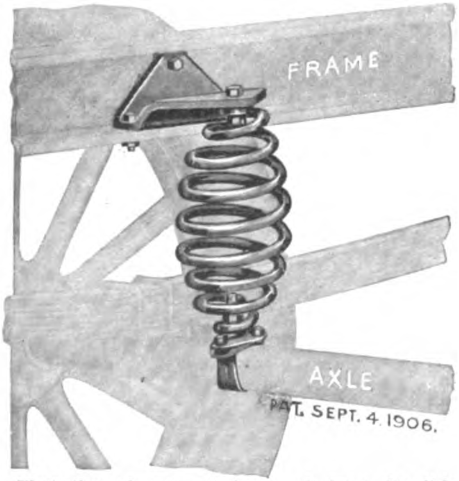


Illustration of rear attachment of Sager Equalizing Springs to car with pressed steel frame.

Attachments are carried in stock for every make of domestic cars and for most foreign cars. These springs act very freely within a certain limit, or where circle of spring is largest, however, they multiply in stiffness very rapidly and gently check the downthrust of body, also rebound.

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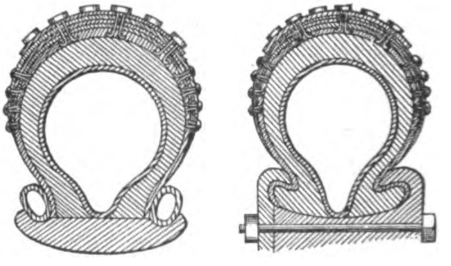
## THE "BRICTSON" DETACHABLE TREAD

The Brictson Detachable Tread is manufactured by the Brictson Mfg. Co., of Brookings, South Dakota. This detachable tread or protector is designed for pneumatic tires of either clincher or quick detachable rim type.

It is made of chrome leather and canvas, with steel studs in the middle which prevent skidding and take the wear of the road. The sides of the protector are fitted with large oval-head rivets to take the wear of ruts, curb-stones, etc. The protector entirely encloses the tire thus keeping sand, water, mud, etc., from getting on the inner tube.



The "Brictson" Detachable Tread: the cut on the left shows the protector mounted on a Quick Detachable Tire and the cut on the right shows the protector mounted on a Clincher Tire.

The greatest feature of this protector is the way in which it is fastened. No fixtures or straps of any kind are required to hold it in place, it being held simply by air pressure between the tire proper and the rim. This simple and effective way of attaching makes it easy to get at the inner tube which it is said can be changed as quickly as if the tire casing alone was on the wheel. The manufacturer claims this protector to positively prevent blowouts and to wear as long as from three to six new rubber tires on the same road and costs about half the price of a tire. The protectors are made in all sizes from 26x2 inches up to 36x5 inches.

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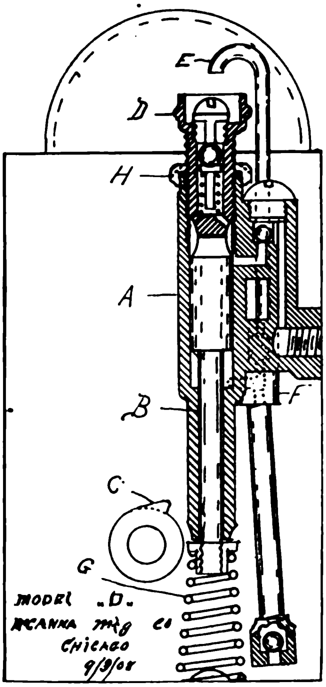
The Dayton Motor Car Company, of Dayton, Ohio, has increased its capital stock from $50,000 to $500,000.

## McCANNA MODEL D LUBRICATOR

McCanna Mfg. Co., 56 North Jefferson street, Chicago, Ill., have brought out a new constant sight feed oiler of simple construction designed to meet the requirements of 1909 buyers, being priced to correspond with the trend of the times toward moderate priced cars.

Referring to the line cut herewith, "A" is the pump body carried inside the reservoir; "B" is a double acting plunger; "C" the cam shaft; "D" is the sight feed chamber and adjusting stud; "E" sight feed discharge nozzle; "F" the primary pump.



Sectional view McCanna Model D Lubricator.

The design and action of this oiler makes the discharge to the point to be lubricated rapid while the discharge of the primary pump to the sight feed chamber "D" is slow so that the drops may be counted.

The cam "C" engages the plunger "B," forcing it down and driving the oil thru pump "F" and discharge at "E," the upper end of "B" drawing the oil from chamber "D" at the same time. When the cam "C" releases the plunger "B" the spring "G" forces the oil to the desired point, and at the same time takes in another charge in pump "F."

The adjustment of this lubricator is extremely simple and once made and locked is absolutely rigid, it being only necessary to loosen lock nut "H" and raise or lower "D." Raising "D" increases the quantity while lowering it reduces the quantity. When satisfactory adjustment has been obtained the locknut "H" is tightened.

The reservoir is made of pressed steel enameled any color, and the cover is of brass, making a very attractive, light and rigid construction.

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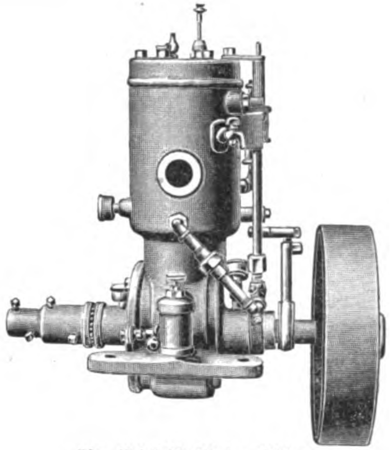
## THE FAIRFIELD MARINE MOTOR

This motor is made by the Fairfield Motor Co., of Bridgeport, Conn., controlled by the Consolidated Carpet Sewing Machine Co. It is a 2-cycle, reversible motor made in several sizes from 1 to 6 H. P. The cylinder is bored and reamed to standard size and the connecting rods are cast of phosphor bronze. The bearings are all reamed to size, scraped and lapped and on the larger sizes are cast integral with the engine base. The crank shaft is drop forged from 45 degree carbon steel with the grain of the metal following the turn of the crank. A simple make and break ignition system is used. Both the cylinder and head are water jacketed. Piping and other fittings are all polished brass and all water fittings are for salt water use. Relief cocks are provided on the 4½ and 6 H. P. sizes to enable easy starting. The lubrication of the cylinders is accomplished by means of a sight feed lubricator and the main journals are lubricated from compression grease cups.



The Fairfield Marine Motor.

This concern also makes a 1 H. P. jump spark engine called the "Bull Pup," and a 10 H. P., 2-cylinder high speed marine engine.

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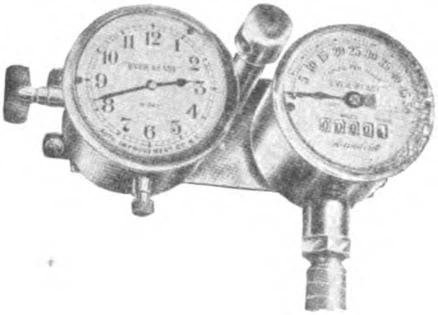
These engines are fitted with a spark lead changer so arranged that they can be reversed without stopping. Other features are the use of ball bearing timers, and the hollow connecting rods filled with Non-Fluid oil to keep the crank pin oiled.

Breed & DeBlois, Broadway and 62d St., New York City, will include in their 1909 line of marine motors a 4 H. P., double cylinder model; 8 H. P., double cylinder; 12 H. P., 3-cylinder; 16-22 H. P., 4-cylinder; 25-35 H. P., 4-cylinder; 50-65 H. P., 4-cylinder; 75 H. P., 6-cylinder. All these excepting the 4 H. P. size will contain reverse gears.

## NEW "EVER READY" SPEEDOMETERS

The line of speedometers offered for 1909 by Auto Improvement Co., 304-322 Hudson Street, New York City, includes six different instruments for pedal and motor cycles and automobiles. They are also offering a clock separately and in combination with the runabout and touring car instruments. These two combinations are illustrated herewith. The new motor cycle model will be described in the Motor Cycle Department of "The Journal."



The "Ever Ready" Runabout Twin.

The Ever Ready "Runabout Twin" consists of a 50 or 80 mile speedometer and the Ever Ready 8-day clock. The two instruments are mounted on a substantial offset bracket in the center of which is an electric light that throws rays on both dials when the current is turned on. The push button which operates this light may be placed where convenient. The list price of this combination is $30.

The runabout instrument lists by itself at $15. It has a new direct drive season register which records 10,000 miles and automatically resets to 0.

The "Ever Ready" Tourameter Twin.

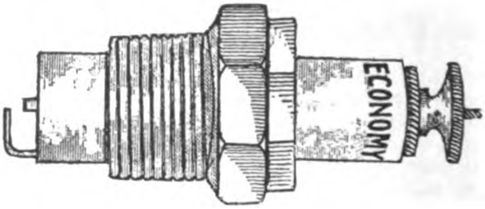
The "Tourameter-Twin" combination lists at $40 and the speedometer alone at $25. With maximum hand on the speedometer the price is $5 extra. The "Tourameter" registers speed up to 50 miles per hour. It has a 100-mile trip and a 10,000-mile season odometer.

The new direct drive odometer used in these instruments have no springs in their make-up. It was tested by the equivalent of a 100,000-mile run on a special testing machine before being adopted. The 1909 attaching bracket is a new construction, the one size being adaptable for practically all makes and models of cars.

The "Ever Ready" eight-day offset clock lists at $10. It is water and dust proof and is provided with a secret lock which prevents its removal from the car. The dial is silvered and the figures are black. This clock has been designed especially for automobile service.

## THE ECONOMY SPARK PLUG

This plug has been placed on the market by Economy Manufacturing Co., 199-201 Grand Street, New York City. The insulator is a single, large piece of strong porcelain. Between the shoulder of the porcelain, which sets into the enlarged portion of the shell and the end of the top bushing, thick asbestos cord is wound, to relieve pressure on the porcelain when the bushing is turned down to make a tight joint, and to make it absolutely air and heat proof.



The "Economy" Spark Plug.

For both electrode and sparking point the best known Meteor wire is used which, it is said, is an absolute substitute for platinum, with much less corrosion than platinum, and will give a continuous and uninterrupted spark.

## GREASE GUN WITH GROUND STEEL PISTON RINGS

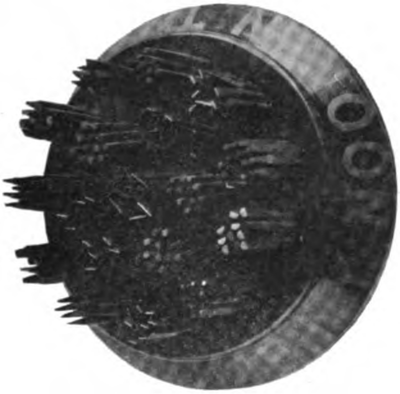
The Beckley-Ralston Co., 80-82 Michigan Avenue, Chicago, Ill., have just added to their line of automobiles sundries a new oil and grease gun with ground steel piston rings fitted to the plunger. These rings are turned eccentric to retain a perfect circle after being sawed to spring into the cylinder. After being fitted, the rings are "ground in" by hand to obtain a perfect compression, and any wear that might occur is taken up by the spring of the rings, the same as in an engine cylinder.

The Beckley-Ralston Oil and Grease Gun.

A special seamless tubing is used of extra heavy gauge in order to withstand rough usage without being dented. A ⅛-in. spout is supplied for use with oil, or a ¼-in. for soft grease. Its grease capacity is one pound. The list price is $3.00. The accompanying illustration shows its interior construction.

## THE "NOONAN" TOOL DISPLAY CASE

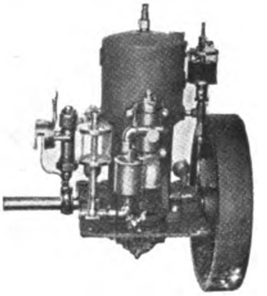
A. S. Noonan Tool and Machine Works, Rome, N. Y., manufacturer of Noonan's automobile repair tools, has recently placed on the market a new display case in connection with his tools. Heretofore Noonan's tools have been sold only in sets and this case was designed as a matter of necessity, the case being made in two sizes, very handsomely finished and designed to set on the show case where the Noonan tools are carried in stock.


The "Noonan" Tool Display Case.

One size case holds 300 tools 4 in. long, 25 different shapes, and lists at $17. The other size case holds 216 tools 6 in. long, 18 different styles, and lists at $12. These tools can be sold singly and reordered in any quantity as they are sold.

## DuBRIE 1909 KEROSENE MOTOR

The DuBrie Motor Co., of 436-442 Guoin St., Detroit, Mich., have made several detail refinements in their kerosene marine motor for 1909. In the new motor the air intake valve is placed on the opposite side from the exhaust valve, and is opened and closed by the piston, doing away entirely with the mechanically operated valve in the air intake. Clear air only is drawn into the base of the engine as in the 1908 type.


DuBrie 1909 Kerosene Motor.

The generator valve has no moving parts whatever, the ports being opened and closed by the piston travel. This eliminates all wear from the generator valve and the air intake valve. The necessary heat for vaporizing the kerosene is obtained by the air coming into contact with the heat of the piston. In the 1908 type the air was drawn from around the muffler pipe but this construction is eliminated in the 1909 model. All these changes, as will be noted, tend to simplify the motor, and to increase its life.

## VENTNOR MOTOR BOATS

Adolph E. Apel, proprietor of the Ventnor Boat Works, Fifth and C Avenues, Ventnor, N. J., has designed and built for the 1909 season a semi-race and pleasure boat which allows of high speed when used for racing and may also be used as a family launch.

This new model is called the "Splinter." It is built in 26, 32 and 40 ft. lengths. The 26-footer has a 4-foot beam, and is guaranteed to make a speed of from 20 to 25 miles per hour. The cock-pit is 15 x 3½ ft. and will accommodate 5 to 6 persons. All the inside of cock-pit is finished natural with two coats of best spar varnish. Coamings and all trimming filled and finished natural with at least three coats of best marine spar varnish and rubbed between each coat. The rudder, strutt cutwater and necessary deck hardware is of polished brass. The boats are equipped with "Barber" Multiple Cylinder Engines. The prices range from $650 for the 20-mile-an-hour boat up to $2,200 for the 30-mile-per-hour boat. These prices do not include the outfit or reverse gear, which are furnished at an additional cost, according to the different sizes and power, from $50.00 to $250.00. Mahogany or any other kind of fancy hardware trimmings, instead of oak, are furnished at extra cost.

The De Luxe Motor Car Co., of Detroit, Mich., have established a New York City branch house at 1663 Broadway.

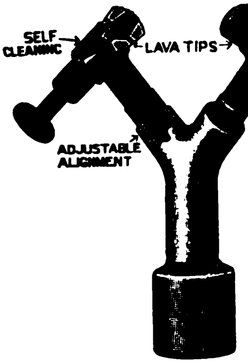
The Common Council of Fond du Lac, Wis., has passed an ordinance requiring all garages to be made fireproof, present buildings rebuilt and new ones according to the new code.

President George F. Lee, of the Wilkes-Barre Automobile Club, announces that the next hill-climbing contest held under the auspices of the Wilkes-Barre Club up the famous Giant's Despair Course on Wilkes-Barre Mountain will be on May 29 of next year.

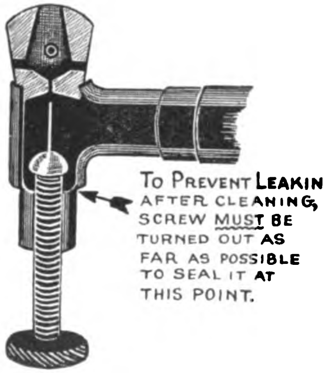
A big change is taking place in the retail field of Cleveland, Ohio, namely, the absorption of the Metropolitan Motor Car Co., agents for the Pierce and Knox cars, by the Studebaker-Garford combine, which latter concern will use the entire garage of the Metropolitan Co. The S-G concern will sell the Studebaker electric pleasure and commercial vehicles, as well as the E. M. F. line.

## ACETYLENE BURNER WITH CLEANER AND ALIGNMENT ADJUSTING DEVICE

The "Drake" acetylene burner, here illustrated, possesses two particularly novel and interesting features. One of these is an arrangement for instantly cleaning the small gas orifice which is a necessary constructive feature of acetylene burners. This cleaning device consists of a small screw with a knurled head on the outer end and tapering to a needle point at its inner end. By turning the screw inward the needle point is pushed thru the small gas orifice and cleanses it of all obstructing matter. When the tip is clean the screw is turned back till the knob shaped head of the screw rests upon the inner side of the burner arm, thus preventing leakage.



The Drake Self-cleaning Burner with Adjustable Alignment and Interchangeable Tip.


TO PREVENT LEAKING AFTER CLEANING, SCREW MUST BE TURNED OUT AS FAR AS POSSIBLE TO SEAL IT AT THIS POINT.

Enlarged sectional view of cleaning device of the Drake Burner.

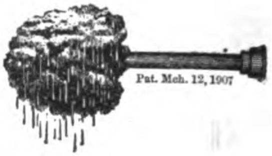
The other most prominent feature of the Drake burner is the device for aligning the flames. The side arms are screwed into the main stem, the threads being 56 to the inch. The arms are very rigid but may be turned without breaking and it is therefore possible to readjust the flames should they get out of alignment. The tips are of lava and the cleaning point of music wire, which will not break from vibration.

The accompanying cut clearly shows the self-cleaning arrangement, the lava tips and adjustable alignment. This burner is made in two styles; No. 1 includes the cleaning attachment, whereas style No. 2 is made without this feature. Both styles are made in ¼, ½, ¾ and 1-foot sizes.

This burner is made by Drake Acetylene Burner & Supply Co., of San Jose, Cal., which has offices also at Cleveland, Ohio, and 130-132 Pearl street, New York, the latter in charge of Arthur H. Merriam, who also handles the export business of the company.

## THE "CATARACT" VEHICLE WASHER

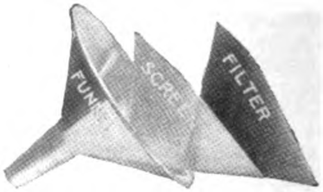
Cataract Auto-Vehicle Washer Co., Topeka, Kan., have placed on the market a new nozzle and mop for washing automobile bodies and under gears. The nozzle is a brass tube with perforated bulb on the end and a dense, soft, cotton mop attached through which the water percolates. Price complete is $1.75 and extra mops list at 50 cents each. This washer is ready for attaching to any common garden hose. The manufacturers are desirous of getting in touch with good dealers and offer liberal discounts.



The "Cataract" Vehicle Washer.

## THE D. A. G. CHEMICAL GASOLINE FILTER

Denver Auto Goods Co., 16th and Broadway, Denver, Col., have placed on the market a gasoline funnel possessing a unique feature in the form of a chemical wool filter. This filter cloth fits snugly into the funnel and will filter the gasoline as fast as it can feed through a one-inch hole. With the funnel is also furnished a perforated tin strainer through which water may be strained in filling the radiator. Price of the 7-inch size is $1, and of the 10-inch size (for garage use) is $1.25.



The D. A. G. Chemical Gasoline Filter.

The Trojan Motor Company of Louisville, Kentucky, are on the market with a line of single and multi-cylinder air and water cooled two-cycle motors. The growing demand for two-cycle air cooled motors make this line of particular interest. A complete description of the motors will appear in the next issue of the "Journal."

# AUTOMOBILE and BICYCLE TAPE

As the largest manufacturers of friction tape for electrical purposes we solicit the business of the Automobile and Bicycle trade for Walpole Insulation and Tire Tape.

Its adhesiveness and strength are long-lived—guaranteed for one year, and rolls now three years old are fresh and "live."

Made by Electrical tape manufacturers, its insulating properties are quite different from ordinary Bicycle or Automobile tape, a point worthy of consideration when the taping of ignition connections is required.

Write for sample rolls and prices.

**Massachusetts Chemical Co.**

SOLE FACTORS:-
WALPOLE RUBBER WORKS
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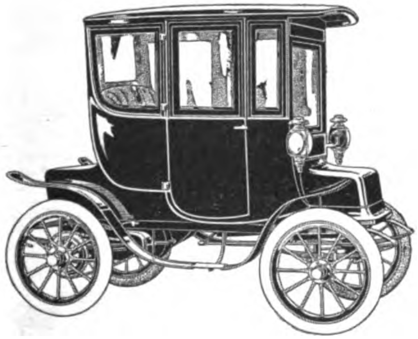

THE finish and appearance of an Electric Vehicle counts much, but the important parts are down where they cannot be readily seen.

## RAUCH & LANG ELECTRICS

are the handsomest machines on the market and we can convince you they are the best if you will allow us to take one apart and explain its machinery to you.

Our 1909 model four passenger coupe, operated from the inside, is the most comfortable and convenient motor for city and suburban use. Easily operated by woman or child.

Secure the gratitude of your wife or daughter by purchasing one of our superb Electrics for Christmas. Visit one of the following salesrooms or write for catalog describing and illustrating our eleven models. See our exhibits at New York and Chicago Auto Shows.

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FIFTY-FIVE YEARS' EXPERIENCE BUILDING FINE CARRIAGES

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DETROIT, MICH., Wm. F. V Neumann & Co., 1342 Woodward Ave.
ST. LOUIS, MO., Union Electric Light & Power Co.
TOLEDO, OHIO, Toledo Motor Car Co.
DAVENPORT, IOWA, Mason Carriage Co.
MANCHESTER, N. H., Jas. A. Wellman, Pembroke Building.
ERIE, PA., A. H. Murphy, 918 State St.
OMAHA, NEB., J. J. Deright & Co., 1010 Farnum Ave.
PHILADELPHIA, PA., Bergdoll Motor Car Co.
OKLAHOMA CITY, OKLA., I. L. Van Camp, 614 West Grand Ave.
CANTON, O., Diebold Motor Car Co.
LIMA, O., Wm. E. Rudy.
DENVER, COLO., Colburn Auto Co., 15th and Colfax Ave.
KANSAS CITY MO., Fletcher Cowherd, Jr., Auto Co.
BALTIMORE, MD., Rice's Garage, North and Madison Ave.
ST. PAUL, MINN, F. W. Ramaley, 650 Grand Ave.
ROCHESTER, N. Y., Arthur McNall, So. Union and Court Sts.
GOSHEN, IND., Teegarden & Putt.
MARIETTA, OHIO, H. B. Coen, 25 St. Clair Building.
SPRINGFIELD, ILL., R. Haas Electric Co., 300 East Monroe St.
ATLANTA, GA., M. Rich.
CINCINNATI, O., Hoscheде Motor Car Co.
FT. WAYNE, IND., Ohnhaus Automobile Co.

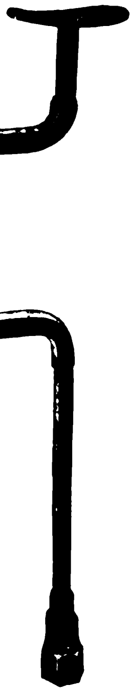
*Reliable dealers wanted to represent us in cities where we have no agents.*

## MOSSBERG TAKES OVER AUTO CLE AND TITUS CLE

The Auto Cle and the new Titus Cle automobile wrenches manufactured by the Quincy, Manchester, Sargent Co., Plainfield, N. J., are now marketed in the East by the Frank Mossberg Co., of Attleboro, Mass.

The Titus Cle Socket Wrench is a new addition to the well-known Auto Cle Family. The Titus Cle consists of a folding handle and seven cold drawn steel sockets graded according to size of bolts and nuts used on automobiles. The sockets being of cold drawn steel are sufficiently thin to be used in any place, and yet strong enough for all purposes, and superior to a cast socket.

With the Titus Cle, adjustments can be easily and quickly made without getting into a cramped or uncomfortable position. The breast or hand plate is swiveled, allowing the handle to turn readily. The wrench has a long reach and can be used in getting inside engine cylinders or in adjusting or removing transmissions as well as being invaluable in removing tire lugs.

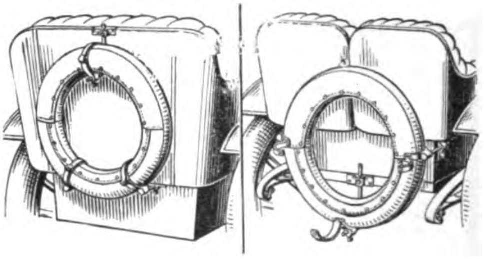


The "Titus Cle" wrench.

The Titus Cle is a smaller outfit than the Auto Cle and lists at $5. Factory Sales Corporation, 235 Randolph Street, Chicago, are Western distributors.

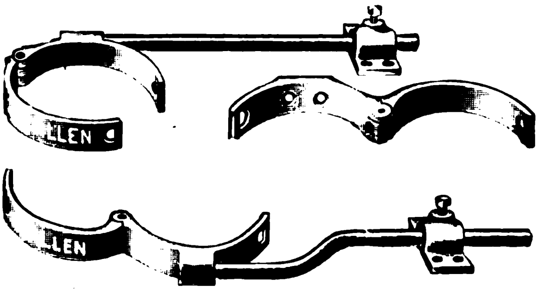
## NEW ALLEN TIRE HOLDERS

Allen Auto Specialty Co., 1931 Broadway, New York City, have added a new style tire holder to their line for 1909, cataloged as No. 2. These holders are hinged so that they will accommodate either one or two tires as required. They may be detached from the car being held by set screws. These holders are made of Parson's Manganese bronze which can be bent to any desired shape if heated to a cherry red. This process will not detract from their rigidity or strength. No. 2 holders list at $9 per set including straps.



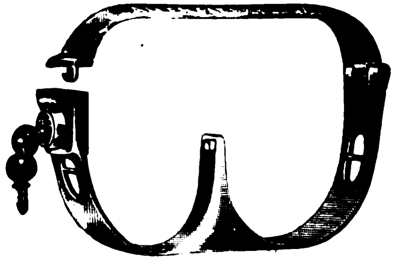
Allen No. 3 Tire Holders for rear of tonneau.

For carrying tires on the back of the tonneau the Allen Company furnishes a special bracket which may be attached to the top or bottom of the seat back. This bracket with a pair of No. 2 holders with specially bent arms attached under the seat projection as illustrated, make a very effective holder.



Allen No. 2 Tire Holders.

The Allen Company is also putting out a modified form of their No. 1 Tire Lock known as No. 1-X. The only difference between this and the No. 1 is in the shape of the top bar which is curved upward, instead of being straight, and it will therefore accommodate all the larger sizes of tires, demountable rims and spare wheels. Price is $12. This holder has a Yale lock fitted in the casting.



Allen No. 1-X Tire Lock.

## PATTERSON WIRELESS DRY CELL HOLDER

To save automobilists trouble and assure their getting all the ignition service possible out of dry batteries, Stanley & Patterson, 27 Warren Street, New York City, have brought out the Patterson dry cell holder which is without wire connections entirely. This holder is furnished with special dry cells.

The Patterson wireless dry battery holder system makes it possible to carry in one solid, substantial moulded rubber composition plate, as many battery units as the ignition of a car requires. The cells themselves are fitted at the terminal ends with a screw thread same as an incandescent lamp, instead of the ordinary binding posts.

PATTERSON
WIRELESS
BATTERY HOLDER
MODEL FC-6
PATENTED

The Patterson Wireless Dry Cell Holder.

The universal wireless dry battery holder plates are made up in 8-cell and 12-cell capacities, permitting every possible combination from the two binding posts on the plate. These universal plates are provided with three screw plug switches moulded into the rubber plate and by the action of these three (3) plug switches, it is possible to obtain four combinations from the one plate.

To connect up the cells, one need only screw them into the composition plate as the connections are automatically made by this action.

In each cell receptacle, there is provided an automatic bridge which permits the removal of a run-down or exhausted cell from the circuit without interrupting the battery circuit of the remaining cells.

Every detail has been looked after to make the Patterson wireless dry battery holder system complete.

These holders have false removable bottoms, which, when taken out, give enough additional depth to set in the old binding post type of dry cell, if in any emergency on a long trip or cruise, the Patterson type cell cannot be procured. In a case of this sort, binding post batteries can be wired up in the old way and the terminal wires connected to a set of emergency clips on the under side of the plate.

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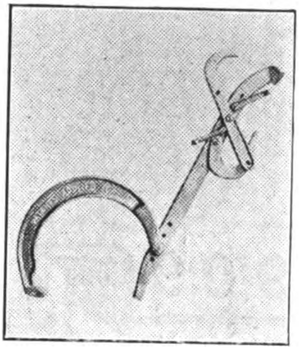
The Davis Mfg. Co., Sixth Street, Milwaukee, Wis., expects to occupy its new engine and motor factory soon.

## THE "UNIVERSAL" AUTO TIRE REMOVER

This tire remover is adapted for use on any make of tire on either clincher or quick detachable rim, and since last described in the September, 1908, issue page 106, has been redesigned with a number of marked improvements. This tool is manufactured by the Universal Auto-Tire Remover, 948 Market Street, (Room 412) San Francisco, Cal., and is shown in latest pattern.

As the method of using the tool has been fully described in the former article, only the improvements will be here explained. The blunt lip of the arched lever has been made more pointed. Both the top and bottom ends of the straight lever have been given different forms all tending to make the tool more efficient. Entirely new features are seen in the short hooks and the horse-shoe shaped piece. The two short hooks are used for the purpose of raising the tire casing in order to remove the lugs and air tube, while the other addition is for the purpose of closing the binding ring on Goodrich Quick Detachable rims. The total length of the tool is 20 inches and weight 4 pounds. It lists at $3.



The "Universal" Auto Tire Remover.

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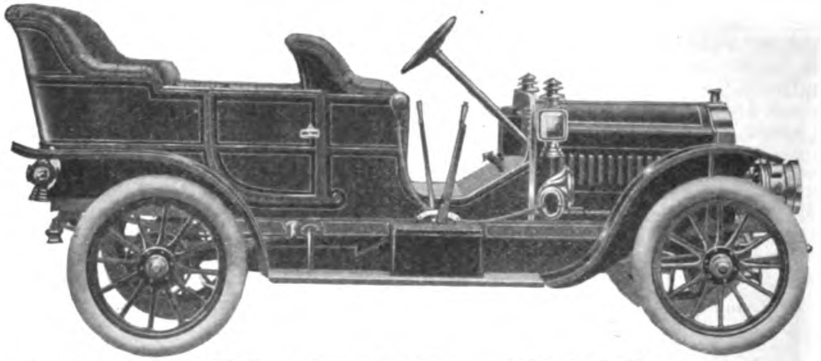
A new schedule of prices on Traver Blowout Patches has been announced by Traver Blowout Patch Co., 1779 Broadway, New York City. No. 0, for 2½ and 3-inch shoes, now lists at $2.50; No. 1, for 3½-in. shoes, $3; No. 2 for 4 and 4½-inch shoes, $3.50; No. 3 for 5 and 5½-inch shoes, $4. These prices are in effect from January 1, 1909.

Contracts have been let for a 2-story and basement addition to the plant of the New Process Raw Hide Co. of Syracuse, N. Y. The new building will be 60x80 feet and of steel and brick construction with cement floors. The cost will be about $30,000 and $12,000 worth of new machinery has been ordered, consisting chiefly of lathes, planers and grinding machines. An additional hardening furnace for treating transmission gears will also be installed. The building will be completed in February.

# Whether Your Satisfaction with Your Car is Full and Complete Depends Wholly on Whether Its Engine is Four-Cycle or Two-Cycle



**1909** Elmore **1909**

VALVELESS 2 CYCLE

**Four Cylinder**
**$2500**

**Three Cylinder**
**$1750**

Any doubt you may entertain will be dispelled the instant you understand the Elmore valveless two-cycle motor.

It makes not a whit of difference what make your car is, or how many cylinders it has, or what horsepower it develops—if it is a four-cycle car **you are not getting what you think you paid for.**

Simply because no four-cycle car can give you the genuine satisfaction with its operation and up-keep that the Elmore can, nor true comfort every minute you are in the car; nor save you the unnecessary expense and exasperation the Elmore will save you.

Four-cycle or two-cycle, valves or no valves makes all the difference in the world.

With the four-cycle, you **must** take valves; with valves you **must** endure trouble, expense and dissatisfaction.

In the four-cycle you **must** put up with power intermittently applied—even in the six-cylinder—which means a car robbed of easeful, comfortable riding qualities.

The only escape from four-cycle disappointments is through ownership of the Elmore, because the Elmore is the **very highest development of the two-cycle principle.**

The Elmore has no valves, delivering you from complication and its irksome burdens—frequent overhauling and repairs, increased cost of up-keep.

Power generated and applied in **ceaseless** flow characterizes the Elmore engine. There are no pauses between impulses. Continuous turning power spells true tire economy and truly superb riding qualities.

Each year sees an increase in the number of Elmore converts. This year is an exception—the increase has been so much greater than in past years.

Eagerness for the 1909 output will clear our floors earlier in the coming season than the demand for previous models ever did in the past.

If you are to be among the happy, satisfied Elmore owners next year, do not disappoint yourself by delaying to place your order at once.

Hunt up the Elmore dealer, have a ride in the car, and send for 1909 literature.

**The Elmore Mfg. Co.,** Amanda Street,
CLYDE, OHIO

Member Association of Licensed Automobile Manufacturers

**Exhibiting in New York only at the Madison Square Garden Show, Jan. 16 to 23**

# MECHANICAL AND TECHNICAL DEPARTMENT

## EDITORS

Gasoline vehicles—Chas. E. Duryea, Reading, Pa., Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.
Two-Cycle Engines—Hugh Dolnar.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

## REGULATIONS OF THIS DEPARTMENT

Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, CARE OF THE CYCLE AND AUTOMOBILE TRADE JOURNAL, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle inquiries will be found in that department.

Questions will not be answered in this department unless the inquirer gives his name and address. The name and address will not be published if so requested.

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### LOCATING A TIGHT PISTON

[229.] I am employed in building gasoline engines and we are often bothered with tight pistons when testing an engine; cylinders and pistons are ground.

The piston sticks on account of its being too tight a fit or because the cylinder and piston in expanding does so out of round or out of straight, or may be a combination of all three, anyway it causes a distinct pound and we are unable to locate the piston that is causing the trouble, have tried various ways to locate it by the sound, but cannot do so, we always have to take all the pistons out and examine them and then file down any spots that show excessive tightness.

Can you suggest any remedy for this trouble, also can you tell me of any way in which I may be able to locate the tight piston without taking them all out?

WAYZATA, MINN. W. I. BOWMAN.

You trouble is due to the pistons being a little too large in the first place. Note carefully where the tight spots appear and determine if these are at certain spots on the pistons every time or not. If at the head end, make that end a little smaller as is commonly done. If at a rib on the inside of the piston, make the rib a little lighter. Sometimes the wristpin does not get hot as does the remainder of the piston and if fastened to both walls of the piston it holds them together and the expansion makes the cross diameter much larger. Maybe the fault is in the cylinders. If there is a spot which is thrown inward when the walls get hot, as might be done by the water jacket wall at some place, this could cause the trouble. Or if there is a spot which is not properly cooled and this gets hotter than the boiling point of the oil it will get dry and the piston will knock when it passes over this part of the wall. A higher fire test oil will stop the trouble in this case.

The best way to locate the troublesome piston is by the feeling. A short small rod of wood or metal with one end against the teeth and the other against the cylinder that is pounding will feel decidedly different than if against a cylinder that is running smoothly.—C. E. D.

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### BALANCING A SINGLE CYLINDER MOTOR

[207.] Would you print in your "Trade Journal," how to balance a single cylinder air cooled motor and how much must the exhaust valve lift. The cylinder is 3 7-16 bore by 3¾ stroke.

PHILA., PA. H. B.

A single cylinder motor cannot be easily balanced. Weights on the fly wheel to balance the piston will make a movement across the axis of the cylinder that is just as bad as the unbalanced piston. The best that can be done is to slightly more than balance the crank and its end of the connecting rod. Any poppet valve is full open when it has lifted ¼ of the diameter of the opening. This is not exactly true if there is a large taper to the valve seat and it is long. The change of direction of the gases as they pass out under a poppet valve results in jamming the passage so that it is usually not necessary to lift the valve the full theoretical lift.—C. E. D.

## STROKE, BORE, AND AUTOMATIC CLUTCHES

[221.] Being a reader of the "Auto Trade Journal," I take the liberty of asking you a few questions:

In wiring a jump spark system, is it absolutely necessary that the positive battery terminal be wired to the coil, leaving the negative to be grounded to frame, or does it really matter which is wired to the coil?

Which is considered the better practice —stroke and bore the same—stroke longer or shorter than the diameter of bore? As I understand it, the longer the stroke the heavier the fly wheel making a slower speed engine—and when the stroke and bore are the same the engine carries a lighter fly wheel, is necessarily more flexible, but more easily stalled.

With stroke and bore the same, what would be the effect of putting on a slightly heavier fly wheel, also making connecting rods and bearings somewhat heavier. Above fly wheel to be of same diameter as the one now in use.

I refer to a Ford Runabout, $700. The great trouble with that engine being the necessity of speeding engine way up in taking up the load, on the slightest inequality in the street.

Would a sliding gear transmission so arranged as to automatically engage the clutch gradually after each gear shift, thus doing away with the clutch pedal be practical unsaleable?

CINCINNATI, OHIO. W. D. NIXON, JR.

I do not think it matters which way the current runs. There is no best practice in anything. Designers hunt for that compromise which seems to fit the needs of the case at hand. During some years past there was a tendency towards large bores and short strokes to keep the motors short and of high speed without getting the piston speed and friction too high. Lately there has been a number of cars built abroad with long stroke and limited bore to meet certain racing rules. These have shown up well and there is some tendency toward longer strokes. I favor a bore and stroke about equal. Heavier fly wheel will help some in starting but it is more essential that your mixture be right so the power will keep on coming instead of trying to start on the stored energy of the fly wheel. There is little need for heavier connecting rods for the fly wheel does not work on them but on the transmitting mechanism. Be sure your cylinders are tight so the pressure does not get away without working. Let the clutch slip a little. Your suggestion to supply an automatic clutch and gear change is good but not new. The Sturtevant Mill Co., of Boston, Mass., have built cars that way for some time but are not in the auto business so a really fine device lies unknown. With their arrangement the engine cannot be stalled, there is no thought about the clutches and gears and the device although quite simple shifts to the proper gear ratio when the time arrives for its use.—C. E. D.

## CONCERNING PRESSURE GASOLINE FEEDS

[223.] I have a car the gasoline tank of which is located under the seat, and as the carbureter is only about two or three inches lower than the bottom of the tank, I am unable to take some of the steepest hills unless the tank is about half full of gasoline. In order to overcome this difficulty, I have in mind closing the vent in the tank and connecting same with the exhaust manifold on the engine and thus subject the tank to the back pressure caused by the muffler, and I believe this pressure should be sufficient to cause the gasoline to flow to the carbureter even although this were somewhat higher than the bottom of the tank at times, as in ascending steep hills.

I would like to know what is necessary in the way of protection in order to keep the sparks from the exhaust from communicating with the gasoline in the tank. Would a long coil of small tubing be sufficient, or would it be necessary to use some special fitting with a fine wire screen inside same, and if the latter is required, I would like to know if same can be purchased in the market and from whom?

NEW YORK, N. Y. A. J H.

You can keep flame from reaching the tank by ramming some gauze into the pipe. I would favor putting in a check valve so that the pressure once in cannot get out again. Otherwise there will be likely to be a more or less constant in and outflow and every outflow will take out some gasoline vapor and thus waste fuel as well as make odor.

The exhaust gases contain some water vapor which will condense so the less there is admitted the less water will get into the gaoline.—C. E. D.

## GEARED ALL RIGHT—LOOK ELSEWHERE

[183.] I have recently installed an air-cooled engine on a locomobile steam carriage and fail to get the power I expected from the engine. It is a two-cylinder, 3¾x 3¾ stroke, geared to the 28-inch wheels of the carriage 4 to 1.

At this rate of gearing I have figured the machine to go about 15 miles per hour and engine to go about 700 revolutions per minute.

Am I geared high enough or not?

DOVER, N. J. W. H.

I do not think you are geared too high. The rear wheels are small and should turn easily. Be sure the carriage pushes easily. There is no use trying to overcome a dragging brake, or some similar loss of power. Then go after the engine and be sure that it does its duty.—C. E. D.

## CAN AIR-COOLED ENGINE BE USED IN BOAT?

[194.] Will you kindly give me a little information regarding the use of air-cooled cylinders on motor boats.

Would a 4-cycle, 4½x5 engine running at 500 R. P. M. constantly for five or six hours, become too hot for satisfactory operation?

Also, is their any special objection to using a high speed auto engine say 1000 R. P. M. connecting same to propeller shaft with a two to one gear and using a propeller of such dimensions as to reduce the speed of engine to 800 R. P. M.

Would the increased efficiency of the high speed engine be greater than the loss due to gearing, and would the reduced speed of same, allow it to do constant

If the motor is set horizontally and the gears, so cut, to mesh properly with the pitch of the propeller shaft gear, will not the original oiling system be satisfactory?

BALTIMORE, MD. P R. BRICE.

Whether a motor will overheat in six hours constant running depends on so many things that to answer yes or no would mislead you. I am sure an air-cooled motor can do this if a fair blast is provided but you do not mention the fan. Much also depends on the lubrication, the quality of the mixture and fit of the rings. An air cooled can do better work than a water cooled engine but many of them do not. In other words they are more difficult to get right but when right they are better than the water cooled.

I see no objection to high speeds so long as lubrication can be maintained. The parts must be made stronger and the reciprocating parts should be light but the high speed adds to the range without using the change gear so much and also adds to the efficiency if there is no loss in some other way as by opening the ports too early.

I do not favor gearing a propeller. The noise and cost of the gears as well as the friction losses will much overbalance the gain you mention. Use a narrow blade large diameter propeller and let it turn fast.

I see no reason why any efficient system of oiling will not work all right.—C. E. D.

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## ENGINE RUNS TOO FAST

[203.] Will you kindly give me through the columns of your journal the information I am seeking?

I have a motor I used in a boat and was unable to control it, as I think, because of the excessive compression. With the throttle almost closed, and spark retarded the engine ran as fast as I would like to have it with throttle half open.

The engine (I do not know the make) is a water-cooled, four-cylinder, four-cycle, cylinders cast in pairs, valve chambers offset, valves all on one side, mechanically operated, with detachable water jacketed heads. It has 4¼ in. bore and 6¼ in. stroke. When piston is at top end of stroke there is a distance of one inch to underneath side of head. The size of valve chamber is 3x3x⅝ in.

What would I like to have you tell me is, in designing a pattern for new heads, about how much can I recess pattern to bring the compression somewhere within normal? Would like to be able to run very slowly and from that up to say 500 revolutions per minute.

CAMBRIDGE, MASS. F C. CURTIS.

Your complaint is a queer one. Most folks cannot get their engines to run fast enough. Unless the engine preignites and pounds I would not change it. The compression space sounds small to me and I would prefer the head raised ⅝ of an in. But don't do it unless there is a reason for it. The probable fault is that your carburetor delivers a better mixture when its throttle is almost closed than at any other time. I have frequently noticed that the fine mixture produced by drawing the air and liquid through a small opening would speed up the engine and you seem to have an unusually good example of this. Try a different form of throttle and report to us.—C. E. D.

Make certain by tests that your spark actually takes place just after the head and dead center has been reached by the piston when the spark lever is fully retarded.—Ed.

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## BEST MATERIAL FOR M. & B. CONTACT POINTS

[201.] Will you kindly advise through your valued paper the following questions:

What metal gives the best results in make and break spark points? Ignition is first from storage battery, later from dynamo. In our stationary engine, spark points need trimming frequently and don't last long.

If you know of a metal, being a good conductor and lasting a good while, I would try it, by inserting it, as a contact point

DENISON, TEX. AD. ELKERT.

The best metal is probably an alloy of platinum and iridium. This is very hard and must be brazed on. It is also costly. I finally adopted a copper silver alloy that is not so hard nor is it so expensive. The use of silver is not uncommon for such work. Much depends on the kind of current used. A storage battery is likely to send too much current through the coil and burn the points as well as be wasteful of current. The voltage should be high and the amperage low, 10 to 15 v and 2 or 3 amperes on a meter is ample to give a good m and b spark. If the meter is connected while the engine is running it will show much less quantity of current than this because the circuit is broken part of the time. C. E. D.

## LONG OR SHORT STROKE?

[210.] I would appreciate it if you would enlighten me on the following:

Why do most all automobile manufacturers use such short stroke engines, and advantage gained by it?

If an engine 4x4 develops certain H. P. at 900 revolutions the piston travel of which would be 600 feet per minute would not an engine 4 bore and 6 in. stroke have the same power as the above engine at 600 revolutions and the piston travel would be the same, namely, 600 feet?

Now, if I should take two identical cars, in one put the 4x4 engine and a gear ratio of 3 to 1 and in other put the 4x6 engine with gear ratio of 2 to 1, what advantage would one car have over the other and in what instance?

Can the exhaust ports in a two-cycle engine be too long? Is it possible to have the exhaust port to extend all way around cylinder, and if it was possible would ¾ high extending all way around cylinder be too large for 5 bore, 6 stroke, what advantage would be gained?

PHILA., PA. W. H. RICHMAN.

The short stroke engine is a short affair. It therefore weighs less and takes less room. Lengthening the stroke and maintaining the same piston speed would give the same power but as you have shown it would decrease the speed range. For auto work an engine that will run up to high speed needs less changes of gearing.

The short stroke engine able to drive the 3 to 1 car as fast as the other would also be able to drive it 50 per cent. stronger at the lower speeds when the engines had about reached the limit of their ability. By careful lubrication it is possible to greatly increase piston speeds and some of the freak long stroke racing engines have shown wonderful results, but I believe the short engine will remain with us. The long stroke engine can be of less bore for a given power and this means smaller pistons and lighter rings with less warping of the parts under heat and consequently less leakage. Also less strain on the bearings and shaft. The best is a medium between, and this I believe is about equal bore and stroke.

I do not believe the exhaust port can be too long, in a 2-cycle. If there is an inlet port on the opposite side of the cylinder, there must be ample wall between or there will be much loss from one port to the other around the piston. This limits the exhaust port around the cylinder and to make up for this it is common to open the exhaust of a 2-cycle somewhat earlier than the exhaust of a 4-cycle. I consider this bad practice which results in loss of work that the 2-cycle engine should and is able to do and which is partly responsible for its lack of economy. Roberts claims (October issue) that he gets best results at 58 deg. to 59 deg. ahead of center; while in the same issue I gave the results of a French table which showed an average opening of 46.56 deg. found in 30 cars of the 4-cycle type. These cars were largely if not wholly racing cars which open their exhausts early. I think this is amply early for a two-cycle for average use. I believe that it is desirable that the engine pull well at low speeds and be economical at average speeds and that high power and high speeds are not the desired thing, to the detriment of these more essential features. Your proposed opening is about 43 deg. and so not far off in my opinion. If the port can be kept well around the cylinder it will get out the old charge without opening so early.

—C. E. D.

## DOUBTFUL OWNER

[232.] I ask your advice. I am the owner of a car claimed to be sixty horse power. The dimensions are 4¾ by 5 in., 4-cylinder, 4-cycle.

Will a motor of this size develop 60 H. P.?

Is the power a company claims, the actual H. P. or is that the power developed by the gears?

DETROIT, MICH. AN OWNER.

I doubt the ability of the size engine you mention to develop 15 H. P. per cylinder. The common formula would indicate about 10 H. P. The power given is usually that delivered at the fly wheel of the engine. Gears have nothing to do with power except to change its form. If geared up the same power appears as speed, less of course the loss by the friction of gears. If geared down the speed is diminshed but the ability to move the load is increased. But in all cases the ability to push and the rate of push or speed are both present and can be interchanged. Thus a horse trotting ten miles per hour and pulling a buggy which requires a pull of ten pounds is doing the same amount of work as if he pulled a plow requiring 100 lbs. to move and did this at one mile per hour.—C. E. D.

## KEROSENE GOOD FOR CYLINDERS

[204.] Would you kindly advise me the best practice as to "coal oiling" the cylinders of automobiles—does it carbonize them or not?

WILMINGTON, DEL. H. T. GAUSE.

Kerosene does not cause carbon in a cylinder but on the contrary cuts the heavy oil loose and lets it blow out. This both makes the pistons free and easy to start when cold and keeps the rings from sticking in their grooves. Some of the high grade engines have been equipped with a hand pump permitting each cylinder to be given a gill of kerosene when left at night. The excess either blows out of the exhaust when started or distills off as a vapor and does no harm. The "decarbonizers" are I believe simply good solvents which do the same thing but probably better than kerosene.—C. E. D.

### ANSWERS TO NO. 95 AND NO. 118

[202.] In reply to No. 95, page 51, October issue, will attempt to describe a lap which I used in cylinders with much success, and with surprisingly accurate results. I took a piece of cast iron pipe about ¾ to 1 inch smaller than the cylinder bore, and about six inches long. Through this at the exact center and about 1½ inches from each end I drilled a hole, tapping the hole at one side of the shell with a R. H. thread and on the opposite with a L. H. thread. Next I made two R. H. and L. H. screws about ¼ inch longer than the outside diameter of the shell, and put them in place, putting over one of them a piece of pipe as a protection, to hold the stem of the lap. I turned up a Morse taper on the lathe, to fit the drill press head and ground tang. Then drilled the lower end to fit gas pipe bushing easily and slid over bushing putting screws in place in the gas pipe. Next I cast babbit about cast iron pipe till it was size of cylinder bore and split vertically with hack saw. Lap was then ready for use and by L. and R. H. screws was able to expand it to enlarge cylinder bore. Have used it with unvarying success and find it can be used with little danger of "swelling" the cylinder bore, if the drill press head is moved up and down continuously and steadily. Flour, emery and kerosene for lapping, and ground glass and kerosene for finishing with clear kerosene for polishing I find best. Best of all is to chuck up the cylinder and take out a light cut, but if tools of proper size are not at hand for this, the lap will do the trick. If R. and L. H. threads are not practical, a bolt, with a tit head will do, tapping out one side and leaving other blank for the tit.

Also in answer to No. 118. The best decarbonizer I know is a little kerosene injected into each cylinder while the engine is hot and allowed to stand over night. It will not remove old deposits always, where "burned" on but will in time soften them so they will be blown out. I have had experience with so-called carbon removers and while I see letters from manufacturers telling of their merits, I wonder if these manufacturers actually pulled off a set of cylinders after treated to see how they were? I used a carbon remover, highly endorsed by two manufacturers, in this issue, (October) and after giving it a test, far beyond the time the manufacturers of the preparation claimed necessary, removed it and then removed the cylinders to see the result. It was practically nothing. I was suspicious of the clearness of the liquid and while much (not all) of the carbon was softened, practically none was removed, and I had the cylinders thoroughly scraped. I did this, not to discredit or injure anyone but for a thirst for actual knowledge. I would say scrape your cylinders, change your oil, if too bad, but use kerosene. It takes but a few minutes to "dope" your engine each night and in the end it pays.

BRIDGEPORT, CONN. W. B. UTLEY.

Your lap is interesting and good. Many thanks. The decarbonizer experience is likewise valuable. The bottom idea in all of them is to dissolve the oil that binds the carbon as does kerosene and so let the carbon be blown out. Some solvents are better than others in that they work quicker.—C. E. D.

### COIL OUGHT TO LAST INDEFINITELY

[195.] I am a regular subscriber to your "Journal." I run a 1908 model, two-cylinder, 5-passenger car and am using the coil. Have run my car about 2,500 miles. The last few days I have been bothered a little in starting, one side does not seem to spark well. I believe that the trouble lies in the coil. How long had a coil ought to last without annoying? If I should put in a new coil, what would you advise me to buy?

LINCOLN, NEB. W. W. DAY.

A good coil ought to last forever excepting the wear on the contact points and the possible breaking of the vibrator spring. Examine these things. Some coils are not perfectly insulated and if the sparks are caused to jump beyond the usual distance they may jump inside the coil and puncture the insulation after which the spark will easily jump inside and never jump strongly at the terminals till the broken down insulation is repaired. Many coil makers provide a gap inside the box which is not longer than the strength of the insulation and thus protect the insulation from being strained or broken down.

Better examine the timer and be sure that the coil gets the current. Examine the contacts and see that they are not pitted or dirty.

Coils are so well understood nowadays that any reputable maker can supply you a good one.—C. E. D.

### UNEVEN FIRING OF TWO CYLINDER VERTICAL MOTOR

[222.] Please will you kindly answer the following in your columns:

I have a 2-cylinder 4-cycle upright gas engine and wish to make the cranks opposed. Now will I get an even or uneven exhaust? Or will I get an exhaust the same as a 2-cycle 1-cylinder engine.

BRIDGEPORT, CONN G. A. CLARK.

The ignitions can only occur when the pistons are at the top and since one gets there a half revolution after the other, you will get two explosions a half revolution apart. Two revolutions after the first one it will fire again and this will be 1½ revolutions after the second. So your explosions will be ½ and 1½ apart. This is the objectionable feature of this type of engine.—C. E. D.

## OFFSET CYLINDERS, WIRING, ETC.

[198.] Being a reader of your valuable "Journal," I'm taking the liberty of asking you a few questions regarding an automobile and some parts of the same.

1. How can I time my engine by degrees, as: inlet open 10 deg. past center; how many inches would that be? or in other words I want to know how to tranfer degrees to inches and inches to degrees. 2. Will you send me a sketch showing how to connect a master vibrator with the common four unit coil, and also a diagram showing the connecting of a magneto to one side of a switch and the battery to tho other. 3. When should the primary current on the magneto break, that is how many inches on the fly wheel before the top center is reached on both low and high-tension magnetos. 4. Why are some crank shafts offset and others not, and what are the advantages of offset shafts? 5. How can I figure out how my car is geared on second, third, when first is known? 6. Will you explain the transmission with four speeds ahead direct being on third?

SAN FRANCISCO, CAL. READER.

Draw a circle the same size as the center of the crank pin makes. That is, if your engine stroke is six inches, draw a six inch circle. Let one diameter of this represent the dead center line of the engine. Measure off ten degrees from this line to each side and draw a chord. The height of the arc measured along the dead center line is the amount the piston must move in this particular ten degrees. It would move the same amount if it moved to the other side of the center. If this is not plain to you make a crank and connecting rod out of paste board and try it out. I am not sure just what you mean by master vibrator. I understand this to be a separate vibrator which serves all the coils. I would screw down the present vibrator screws and connect the coil-to-battery wires to the master device and thence to the battery. The coil-to-timer wires would go to the timer just the same. Thus each coil would operate at the proper time but the master vibrator instead of the regular one would do the buzzing.

There can be no rule for timing the break of the primary current. It must be broken far enough ahead to allow for the lag of the vibrator, the loss of time in the coil and similar things.

A crank shaft should be offset because the pressure is all on the down stroke and by offsetting, the piston is more nearly directly over the crank pin to which it is supplying power. When not offset the pin is at one side all the time and the whole working stroke is made with the piston forced against one side of the cylinder making needless friction. This pressure is much greater than the weight of the piston in a horizontal engine which we hear talked about so much and it is therefore much more important to avoid. With the offset arrangement, the pressure is against one side of the cylinder for part of the stroke then directly down then against the other side then again directly down and finally against the first side again. Some folks think this change of pressure from one side to the other is likely to cause knocking but I have used offset engines for 11 years and never found this result. There is a greater angle to the connecting rod on the return stroke but little if any work is being done so this does not matter. Further the offsetting permits making the connecting rod shorter and so keeps the size and weight of the engine down.

Without knowing the construction of the transmission I do not see that there is any relation between them. You can set the clutch and turn the engine over once. Then measure the distance the rig travels. Do this with the other gears and you get the relative proportions. I think this is the real way to compare gears anyhow. Nobody cares how many teeth there are in a set of gears but everybody wants to know how far the rig will travel on any certain gear set. And it is very hard to compare when wheels and rear axle gears both differ.

By suitable rear axle bevels the engine and vehicle can be fitted to each other at any speed. This is direct drive. Then provide gears to drive slower and you have the low gear. Now provide gears to drive faster and you have a speed that is higher than direct. Just as easy to do this as to provide any other speed.—C. E. D.

## ABOUT USING SOLID TIRES

[197.] Will you please give me what information you can in regard to the following in the next issue of "The Journal":

I notice the Holsman Auto engine is oiled by mixing oil and gasoline in tank. Will any good oil mix with gasoline and form an emulsion and is this manner of oiling practical for motor-bike engine of three horse power and also what proportions of oil and gasoline would you advise using?

Are the solid rubber tires that are advertised so extensively any good for light runabout, say Maxwell, Ford or Reo. Will they reduce the speed of the machine and if so to what extent?

Do they have a tendency to make machine ride hard and do they cause sufficient added vibration to harm the engine and transmission?

What make of solid tire would you advise using on one of these light runabouts if any?

PORT CRANE, N. Y. GARDINER AND HOLCOMB.

Any oil is soluble in gasoline with a few exceptions like castor oil. It does not make an emulsion but simply disappears into the gasoline and imparts some color to it. It mixes thoroughly so far as can be seen and a drop of the mixture on one's finger will leave a trace of oil as the gasoline evaporates. This method is practical for 2-cycle engines or those 4-cycle which like the new Holsman take the mixture into the crank case before passing it to the cylinders. In the crank case the gasoline vaporizes quite fully and there is the tendency to drop the oil. A little oil in the fuel is said to add power and smoothness of running to the average four-cycle engine. The usual mixture is one to two pints to 5 gallons of fuel. It must be high fire test or it will make the mixture overfat.

Solid rubber tires have their places but there must be judgment exercised in selecting the place. I am using 1¼ and 1⅜ on the Buggyauts. I have used 2-in. and larger on the 30 and 36-in. wheels of the old Duryeas. I voted them a failure but I find the large wheels of the Buggyauts just about make up the difference in the types of tires at speeds up to 15 to 18 miles per hour. In general if the road is rough or high speed is desired use air tires. But if your roads are smooth you can use any kind of tires. There is a difference in the riding and unless the rig is built with better springs so as to make up for the loss of the air tires you will notice the difference. I would not advise using solid tires on a small wheeled runabout built for pneumatics.—C. E. D.

## FRONT WHEEL DRIVE

[182.] Please answer the following in the next number of "The Journal":

I have just read of a concern in one of the old numbers of "The Journal" who made an auto which was driven by all four wheels. They claimed the power being applied to all the wheels no differential gear was necessary. Why not? Please explain this. In a rope driven motor buggy do not the ropes get loose and slip when the springs of the machine go down causing loss of power? How do the makers overcome this? Would an auto with front wheel drive climb hills and travel bad roads better than one driven by the rear wheels the weight and power of both machines being the same. Thanking you in advance, I am a

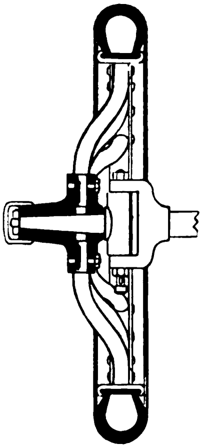
WEBSTER GROVES, MO. SUBSCRIBER.

The differential is needed because the power comes from a single engine. If there is a motor for each wheel its speed will vary as the speed of the wheel varies and there will be no need for gearing to do this work. In the rope drive rigs the front pulley is pretty nearly straight in front of the rear so that the spring action does not affect the tension of the rope much. I think a front drive would travel over soft level roads better than a rear drive but when it comes to climbing hills it would not have enough weight on the drivers. The rear drive tends to lift the front wheels when the engine works hard so this practically brings most of the load on the rear and prevents slip as well as making the pushing of the fronts an easy matter. Slipping of the drivers not only wastes power but tears out the tires rapidly.—C. E. D.

## EASY STEERING FRONT WHEEL

[205.] Enclosed please find print and descriptive circular of vehicle wheel—which is submitted to you for criticism in the columns of this "Journal."

One incentive to the invention of this wheel was the fact that there is a recognized need of improved steering in automobiles, and I believe my method better from any point of view, than the many previous devices intended to accomplish the same ends. I speak with reference to automobiles using the artillery wheel and pneumatic tires, not the buggy type of car with high wheels.



Groth's dished spoke wheel for easy steering.

Would appreciate your opinion as to the efficiency of this construction, the cost as compared with prevalent styles of wheel, and whether such a device is good mechanically.

Awaiting your criticism with much interest, I am,

CINCINNATI, O. GEO. H. GROTH.

Your device appeals to me. Since the days of the cycle I have stood for easy steerings believing them the only safe kind. Your device brings the steering pivot into the plane of the wheel and relieves the steering parts of shock when the wheel strikes a rock or obstruction. It was the shortcomings of the lever steered rigs as they were constructed which has made the wheel steering popular and the public evidently do not know that better steerings can be had. We hear of steering failures almost daily and it is certain that this most essential part of the rig should be safe. I do not see that your device need be much if any more expensive than the usual form while it would add much to safety and ease of steering.—C. E. D.

## THE OTHER 6-CYLINDER CAR MAKERS

[220.] In the December number of the "Automobile Trade Journal," Mr. J. C. Gulith (letter 168) asks for a list of all the motor car manufacturers making six-cylinder cars.

I have enclosed a partial list of the foreign makers of six-cylinder cars for 1909. The cars are grouped under the headings of their respective countries, and are accompanied by numerals which signify the number of six-cylinder models which each maker manufactures.

Among the American six-cylinder cars which were omitted from your list are the Matheson, Palmer-Singer, Perfection, Premier, Gearless, Stilson, Pittsburg and Alco.

NEW YORK CITY. JOHN JAY IDE.

### EUROPEAN SIX-CYLINDER CARS

French—Berliet 2, Brasier 2, Darracq 1, Delauney, Belleville 5, Gladiator 1, Gobron-Brillie 1, Hotchkiss 1, La Buire 4, Lorraine, Dietrich 2, Mors 1, Panhard 1, Peugeot 2, Renault 1, Unic 1.

British—Austin 1, Belsize 1, Brooke 2, Daimler 1, Empress 1, Hillmann, Coatalen 1, Horbick 1, Humber 1, Iris 1, Jackson 1, J. & B. Vertex 1, Lanchester 1, Londonia 1, Maudslay 1, M. M. C. 1, Napier 6, Orleans 1, Owen 1, Rolls-Royce 1, Scout 1, Sheffield, Simplex 1, Siddeley 2, Simms 1, Standard 1, Star 1, Thornycroft 1, Vulcan 1, Weigel 1.

Italian—F. I. A. T. 2, Itala 2, Lancia 1.

German—Mercedes 2.

Belgian—Germain 4, Miesse 1, Minerva 1.

Swiss—Piccard-Pictet, 1.

It is very kind of you to supply the list of foreign six-cylinder cars and I thank you for it. We want all our readers to feel that this is their department and we are always glad to get in it what is asked for. —C. E. D.

## BETTER NOT CHANGE IT

[219.] I am contemplating the purchase of a light touring car of 1909 design, and after looking over the catalogues of several different makes I am in favor of the Chalmers Detroit "30" by reason of its many good features. But what don't appeal to me, and the only fault I have to find with the car is the pump system of water circulation which I do not like, as I much prefer the thermo-syphon system of cooling. Now what I would like to find out is this: By taking out the pump and connecting a pipe in its place, would we have a thermo-syphon system effect with the engine running or would it be necessary to change the radiator and water piping?

N. Y. CITY. J. F. GORDON.

I cannot advise the removal of the pump. The motor is quite efficient and its makers know what they are about. I agree with you in that I prefer the natural circulation but a maker must build for all kinds of people and some are so unreasonable that if they saw the water boiling they would at once say, "Too hot." So long as the pump is in order there is little likelihood of this trouble so many makers prefer to fit the pump. I prefer to know that the water is boiling hot and so long as I do not have to fill the tank too often I will not kick.—C. E. D.

## ANOTHER KNOCK

[172.] Will you please answer through "The Journal."

I have a 4-cylinder runabout. When I make a grade and open the throttle the engine knocks and loses power with spark lever in fourth notch and when I retard to last notch it stops for 5 or 6 rods and then knocks again. Have new batteries and new coil. What is the remedy?

MESHOPPEN, PA. CONSTANT READER.

The knocking of your rig is probably self-ignition ahead of time. There is no harm in an engine firing itself but when it is hot enough to do it too early the result is a knock and loss of power. Maybe your mixture is too fat, maybe the cylinders need scraping to get the carbon out. —C. E. D.

## WANTS DRY CELLS TO OPERATE MOTOR STARTER

[224.] How many dry cells would it require to operate a small electric motor to start a three-inch bore gasoline engine?

MORRISTOWN, N. Y. E. LAWS.

I do not see any way to get at what you need except by trial. I have no data as to how much cranking it takes to get that 3-in. engine going. Take the matter up with some motor maker and see what he can furnish in the motor line and he can tell you what amount and quality of current it requires. There are plenty of toy motors that will run on one dry cell and larger can be had of course. Wind a string around the fly wheel and hang weights on it till you get enough to turn over the engine and then get a motor which will give the same pull on the little pulley.—C. E. D.

## GASOLINE PNEUMATIC TRUCK

[216.] Referring to your answer to Robert G. Patterson in the December "Journal," (referring to gasoline, electric, and hot air engines), I enclose herewith a patent specification of a Gasoline Pneumatic Truck, which might interest your readers.

The heat in this case, which is generated by the compression of the air, is not lost, but is expanded usefully in the motors.

PITTSBURG, PA. W. W. MACFARREN.

The patent shows an engine for compressing air and motors for using it to drive the vehicle with provision for storing the excess again against a time of need as in hill climbing. The immediate transfer of the compressed air does save part of its heat but there is some loss in spite of this. I thank you for calling attention to this. I do not have much faith in a compressed air device. The air is so elastic that it does not lend itself to compression economically. Some form of liquid transmission seems more promising to me.—C. E. D.

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### CONCERNING ROTARY VALVES

[209.] Will you kindly give us your opinion through the "Cycle Automobile Trade Journal" as to what difficulties may arise with rotary valves on a four-cylinder automobile engine.

The valves are attached to the head, and get their motion from the crank shaft either through chain or bevel gear. Packing rings are used to keep the joints tight. An auxiliary exhaust would be used opened and closed by the piston.

Thanking you for your opinion, we are,

FORT WAYNE, IND. O. A. C.

I am a believer in rotary valves. I built a few engines that way and became convinced that the principal difficulty is to get good workmanship. If lubricated and cooled properly they should not give any more trouble than any other slow moving part and not nearly so much as the rapid moving piston. I am sure there is much to be done yet in the development of the gas engine and I look to see more rotary valves in the future.—C. E. D.

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# 2-Cycle Engines

HUGH DOLNAR

### PHENOMENAL 2-CYCLE MOTORS

[211.] Like many another we are interested in the amount of H. P. that can be obtained from 2-cycle engines. Some of the results that you speak of as having seen, and others that you say are possible, make us feel joyously for the time that the 2-cycle engine has at last come into its own, and that all 4-cycles are destined to take a quick trip to the scrap heap. But this elation has often given place to that dark blue outlook on nature and her works whenever we have calmly and coldly sat down in front of a prony brake and worked and strained to make a poor little gasoline engine deliver even two-thirds the power that your engines deliver.

For convenience in figuring engines we use the formula D2 x L x R x N divided by C equals Brake H. P., in which D is the diameter of the cylinder in inches; L the length of the stroke in inches; R the revolutions per minute; N the number of cylinders, and C a constant. We have tested on the brake several standard engines of different makes and the lowest value of C noted has been 13,700. We have also tested a good many experimental motors and have been rather pleased to obtain a value for C as good as 10,700. We have seen values for C for seven standard makes of motors published, as given by representatives of the manufacturers, in which this value runs from 10,000 to 13,500, but when we read in your answer 143, December issue, that you have seen a motor give H. P. upon a basis which would make the value of C about 6,500 we say that "we are from Missouri and that we have got to be shown."

If there is any 2-cycle motor on the market that can actually give such results we should like to be advised of it, as, other things being equal, there would be no reason to give very much consideration to any of the others that we are familiar with.

Either you have exceptional opportunities to see exceptional motors, or else we, and many of the motor manufacturers, are so far behind that some one should wake us up. Which is it?

C. F. ROPER & CO. By C. H. DRAPER.

C. F. Roper. What do you understand by the term "2-cycle"? The full wording, with reference to single acting gas engines is, "A gas-engine cylinder in which every instroke, towards the crank, is a working stroke, and every out-stroke, away from the crank, is a compression stroke," that is to say, two strokes make up the cycle or circle of piston stroke functions, hence "2-stroke cycle" and "2-cycle."

Does your understanding of "2-cycle" of necessity include cylinder charging by single diameter piston displacement, alternately sucking the carburetor and compressing the charge in the crank-box?

Get a 2-cycle motor from Perry O'Key, Columbus, Ohio, and test it on the block. I think he can supply you.

Get a 3-cylinder or 1-cylinder 2-cycle motor, 3½x3½ air-cooled, from S. A. Asquith, Waterloo, Iowa, and try it on your block, and see what it does. One cylinder, 3½x3½, air-cooled, drove Asquith and myself on Waterloo pavement, October 7, 1908, in a 600 pound runabout 20 miles an hour (estimated).

Get a 3-cylinder 3½x3½ of Asquith if he will supply you. If he will not supply you, go and see him and his motor—I did, for my own information, and got it, good and plenty. So can you.

Get a 4-cylinder motor, cylinders 5x5, water-cooled, 2-cycle, from the American Simplex Auto Co., Mishawaka, Indiana. The pistons are one diameter, crank box cylinders supply. Two of these cylinders, I believe, did not see test, showed 41 H. P.

with a muffler and 51 H. P. without a muffler, and with a muffler two of these cylinders, vertical, drove a 5-passenger touring car with cape top, on a dirt road, flying start 1 mile and 200 feet in one minute, I believe, did not see it. I rode this car, it was fast and took no other car's dust while I was on it. The 4-cylinders, 5x5, water-cooled, American Simplex 2-cycle is rated at 80 H. P., is in regular manufacture at Mishawaka, 7-passenger touring car motor. I have drawings of a 3-cylinder 2-cycle air-cooled, 2 diameter pistons, which I expect to show at least 50 H. P., cylinders 4¼x4 inches.

Two-stroke cycle has no connection with crank box pressure cylinder supply.

If I print over my name, the statement that a motor shows x H. P. at y R. P. M., I have seen the motor do it against a prony brake or electrical resistance. If I say "nominal H. P.," or "said to give H. P.," somebody says the motor will do that and that should be printed.

The 2-cycle motor is the final heat motor in my opinion, and can be made to show any power and any speed within the resistance of materials by charge volume and compression increase. With full pure air charge and liquid fuel injection at intake port the 2-cycle motor can show about 2¼ times the power of a good 4-cycle same bore and stroke; the 2-cycle requires less than half 4-cycle cooling effect, same bore and stroke. All small watercooled 2-cycle motors are very wasteful of power because of overcooling, in my own opinion.

Where the one diameter piston displacement sucks a carburetor through a third port, and part of the charge goes directly from the intake port to the exhaust and the charge is mixed with a good big percentage of burned charge residue and the water jacket circulation is good, say an open hydrant cock, the man from "Missouri" is very likely not to find much to see.—H. D.

## DESIGNING A 2-CYCLE ENGINE

I am a subscriber of your "Trade Journal" and read your interesting answers. I am going to build a 2-cycle, 4-cylinder engine. Have I my parts figured out correctly. I send dimensions of my engine cylinders, 5 in. bore, 4½ stroke intake from carburetor down through crank case, 1½ in. from crank case up through long part along cylinder, ⅝ by 1¾ in. long. Port 5½ in. long, port open to cylinder, ½ in. by 2¼ in. with a ½ in. bridge. Exhaust 1¾ in. there are 2¼ in. clearance from piston head to top of cylinder, my cylinders are to be round top, piston has a half circle ledge one inch high, ½ in. wide with a thin copper plate on end of ledge, copper plate is to keep cylinder and piston head from carbonizing, piston has 3 packing rings, 2 at top, 1 at bottom. Fly wheel, 14 in. by 3-in. face, weight about 97 or 100 pounds. How many H. P. at 800, 900, and 1000 rev.

This engine will weigh 385 pounds when completed and what degree shall I make my crank shaft?

MONTPELIER, OHIO. A. L KRIDER.

You seem to have your ideas pretty clear. Make the deflector high as possible. Many 2-cycles lose gas from this cause.

I do not fully understand the use of the copper plate. It seems to me this will get so hot as to preignite. Fly wheel is rather small in diameter. The cranks should stand 90 deg. from each other. Each cylinder ought to give 8, 9 and 10 H. P. at the speeds mentioned but unless you have everything just right you may not get this. The 2-cycle has not been so fully worked out as the four and its output is harder to guess.—C. E. D.

## POSITION OF SPARK WHEN ADVANCED

[206.] Being a constant reader of your valuable magazine and now quite in doubt as to answers of several questions relating to internal combustion engines, I will take advantage of your question column.

The following questions, I think, if published in your magazine, might interest others:

What are advantages and disadvantages of both high and low compression gas engines? When spark is most advanced what is exact position of piston? What is the characteristic difference between a two-port type and a three-port type, two-cycle gas engine? When using graphite for cylinder walls, what form is used, flake or pulverized?

Now a question under Motor Boat Department:

What is the general rule followed to determine the pitch and diameter of a propeller wheel?

Thanking you, I am, respectfully yours,

ITHACA, N. Y. A. R. SCHIELE.

The high compression engine is a speed engine. The low is less speedy but better for power. The high is more economical but more troublesome in the matter of leaks, self-ignition, wear of bearings, and must be stronger. The high gives a succession of high pressure blows on the piston but the low delivers its power more like a steam engine.

The spark can be advanced to any position of the piston permitted by the arrangement and relation of the parts. But bear in mind that the spark lever is thrown forward to allow for the lag of the coil more than to compensate for the speed of the engine. The spark does not occur at speed at the point it is assumed to occur when judged by the position of the lever and inspection at slow speed. This is the principal reason why the make and break spark does not need so much advance.

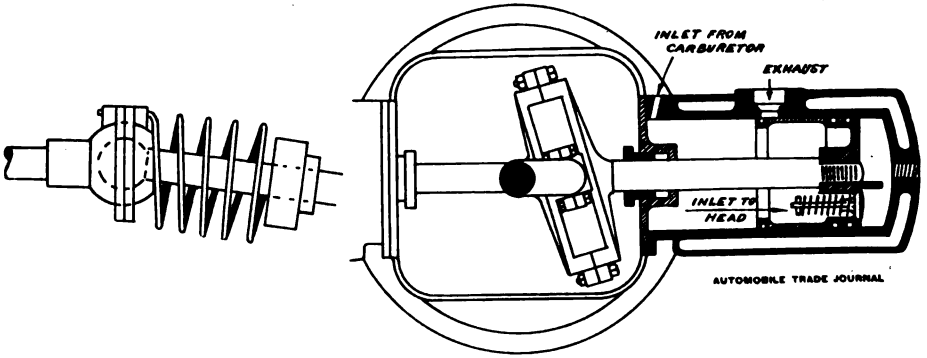
The two-port, two-cycle has a check valve into the crank case. This check opens as soon as there is a slight vacuum and lets in new mixture for half a revolution. With the 3-port form the piston movement forms a vacuum till the piston reaches the upper end of its movement when it uncovers a port and the new supply is sucked in before this port is closed by the down movement. This time of opening is usually not over 90 deg. so the carburetor and pipes must be larger than with the 3-port form. If there is any leak at the crank bearings, the vacuum is likely to be more or less filled by this air and the mixture interfered with. "Valveless" and simplicity sound well but results are what is wanted and my experience indicates that the valved engine is the better form.

The smoother the surfaces the finer the graphite should be. Flake is a different product from the amorphous form. It is claimed to be smoother and certainly looks harder and glossier.

I favor propellers of as large diameter as possible. and of such width of blade and pitch as will take the power of the engine. Seaton says: "The size of a screw depends on so many things that it is very difficult to lay down any single rule for guidance."—C. E. D.

## SCOTCH YOKE 2-CYCLE SUGGESTION

[196.] I am going to take advantage of the privilege given in the "Cycle and Automobile Trade Journal," and ask you a few questions, provided your patience holds out. I have made a small drawing regardless of proportion and dimensions to help explain what I mean:



Suggestion for a horizontal 2-cylinder opposed 2-cycle motor with an inclined Scotch yoke.

(a). What is your opinion as to the sliding box arrangement as indicated in drawing and about what is its efficiency as compared to the ordinary crank?

(b). Would not the slant of the slide tend to decrease the friction?

(c). What is your idea as to the cylinder? I know it cannot be new but I've never seen it or anything about it.

(d). About what per cent. of the power stroke does the piston of any gas engine travel under the actual explosion?

(e). I have noticed on several up-to-date cars that the torsion rod and radius rods are of a different length, theoretically should they not be the same?

(f). What are your opinions as to the universal joint to be used on a light runabout?

NEEDHAM, MASS. NAT. WYETH.

The Scotch yoke idea is not new. The Bailey car made in Springfield, Mass., a couple years ago used it. Doubtless Mr. Bailey can tell you or us why he abandoned it. The inclination is new and may have some good features. It would seem to permit a higher piston speed during the early part of the stroke and so get a greater efficiency out of the gases. But it causes side thrust on the stuffing boxes and this is bad. Bailey used a Hess-Bright bearing at this point and let the case roll along the yoke. I believe a check through the piston is good practice if the piston can be gotten at easily in case of needed repairs. It makes a short direct passage and helps to keep the piston cool. There is no actual explosion in a gas engine. The combustion is so rapid that it is frequently so called but really it is a combustion pure and simple. It begins with the ignition and rapidly spreads to all parts of the charge and seldom is completed before the latter part of the stroke. In fact, with the exhaust pipes off it is a good mixture that will not spit flame out of the exhaust port showing that the combustion is not complete even at the end of the stroke.

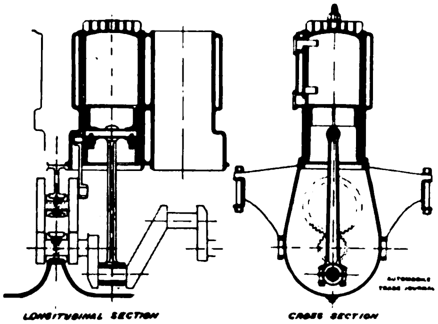
Torsion and radius rods should be the same length but few things are perfect and some things are just as good if not. The amount of movement is so slight that a little difference in the two does not matter much. It is a more serious matter when the radius rod to a chain does not nearly correspond with the distance between the centers of its sprockets.

I see no objection to a flexible drive as you propose. It ought to save strains on the drive and some wear on the tires. The Hobbs drive was shown at the Chicago Show last year and is advertised by Alexander & Cox in our columns.—C. E. D.

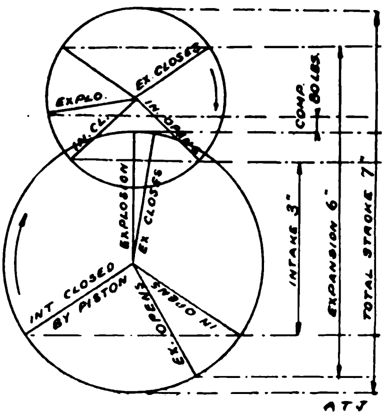
## A NEW SLIDING SLEEVE ENGINE

[214.] The drawings enclosed, illustrate the principle and design for a somewhat radical type of four-cycle motor, which if it can be brought to a practical working basis, that is, one recognized by manufacturers of good cars, possesses, I believe, the elements for the eventual and much looked for ideal automobile motor.

A good strong criticism from you on this principle, will probably be interesting to "Journal" readers and greatly appreciated by myself.



Its basis and principles were founded in an aim to design an automobile motor which would prove silent, economical, simple and compact. There are two prominent sources of noise in the present type, best known, and they are of course, the loud exhaust detonations caused by the high pressure in the cylinders at the time of release, and the knocking of the poppet valves against their seats. In the first case, the gases are expanded in this motor to half the usual pressure before releasement, as will be later seen, and in the second, the poppet valves are entirely eliminated, intake and exhaust ports being opened and closed by a sliding sleeve (shown in drawing), these features make as silent a motor as can well be imagined. The greatest and most commonly conceded waste in the operation of a gasoline engine is the immense loss of energy through the high pressured exhausts. J. E. Homan, the well-known engineer, says: "The enormous waste, as indicated by the figures given, which show that, with average exhaust temperature of 1,760 deg. absolute, or 1,300 deg. F., escaping into an average atmospheric temperature of 70 deg. F., (1.23x.26) 319.8 heat units, or (319.8x778) 248,804 foot pounds, or over 7.5 horse power per pound of fuel gas goes through the exhaust valves, is a good argument for seeking some device to utilize at least a part of this lost energy.



"Although the complications of the Atkinson engine proved it difficult to handle for stationary purposes, there can be no doubt but what it furnishes the elements of the ideal automobile motor, as will doubtless be some day realized." (It will probably be remembered that the Atkinson was of the variable stroke design and practically the same action is obtained in the new motor.)

As will be seen by referring to the drawings, the piston operates inside of a moving cylinder which in turn fits inside of the "barrel" cylinder walls. The moving cylinder is connected with 2-1 gears as shown, and so set as to give accurate timing to the opening of the ports; its outer end forms the head of the combustion chamber and is cooled by means of blades or fins radiating from its center.

The dimensions of a typical motor would be, bore, 5 in.; stroke of piston, 5 in.; travel of moving cylinders, 3 in.; greatest distance between piston head and combustion head at any time, 7 in.; the moving cylinder lapping 1 in. into the travel of the piston.

As will be seen, there is no interference between cylinder head and piston caused by overlapping, for, the cylinder head enters the piston's circle of travel only when the piston is at lower end of its stroke.

This action gives without doubt, an almost perfect combustion, a consequently high efficiency and an almost silent engine.

The lubricating problem would be somewhat harder than in the ordinary models, but certainly easier than in the well-known Silent Knight motor with two concentric sleeves between piston and cylinder walls.

SAN FRANCISCO, CAL. L. A. BRYANT.

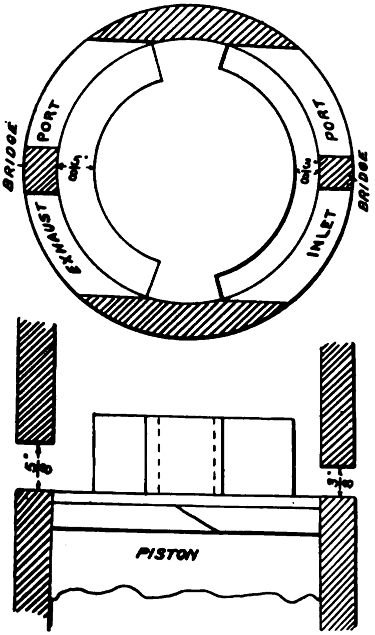
This design is interesting and looks to me well worthy of attention. I am such a believer in simplicity that I do not like things which add parts and at first thought there is a feeling that the gain is by added complexity. But when one considers the absence of valves it seems better. I do not attribute much importance to the silent feature. Folks do not object to noise as a rule. Think of our cobblestone streets, our street cars, the street hawkers, factory whistles and even church bells. The law requires us to toot a horn at every street and alley crossing. The great expansion is good but whether worth the cost I do not know. The Atkinson engine failed to compete with Otto. The compound is out of business although a report before me shows that when run as a simple engine there was used 20 per cent. more fuel for the same power. People do not go riding to save gasoline but they do object to complex mechanism that may give trouble. Also they will buy the low priced article even though they know it will cost more to run. These things you must consider. The work on the head of the cylinder is just as hard as on the piston so you will need almost as large bearings to its rod as to the other. I feel sure our readers will be pleased to hear more about this engine when you have constructed and tried it.—C. E. D.

## ANOTHER 2 CYCLE DESIGN

[212] I submit to you the following specifications for a 6 cylinder, 2-cycle motor. Crank-case supply to be used. Bore, 3½ inches; stroke, 4 inches; inlet port, ⅜ by 4 inches; exhaust, ⅝ by 4 inches; compression space, ¾ inch; deflector, 1 inch high; crank shaft offset, ¾ inch.

Exhaust side will be cooled by water jacket and air cooling by spines will be used on remaining part of cylinder.

The cylinders will be a semi-block casting. That is, the bases will be integral up to the ports, from the ports upward each cylinder will be an individual casting to give more cooling space and equal expansion.



Suggested 2-cycle engine showing the deflector.

The deflector is an integral part of piston 1 inch high, a space of ⅜-inch is left between inlet port and ⅝ between exhaust port. Crank case will be supplied through third port, what size should this port be?

Would my system of cooling be sufficient? It is my opinion that the motor ought to develop 20 horse power with scarcely any vibration owing to overlapping of the explosions as there will be 6 to 1 revolution of the crank. What size of balance wheel would be needed? Can you suggest any points that would increase the efficiency of my motor?

Motor to be used in roadster in connection with Hele Shaw clutch and selective type transmission.

H. M. RAAB.

Why 6 cylinders? I should say without qualification, 3 cylinders instead of six. Three cylinders 2-cyle, 5x4 ins. should show at least 45 H. P., 1200 R. P. M.

For 3½ piston dia. I should not use a chord length of more than 2¼ ins., because of leaving space enough between the ports to surely prevent direct transfer from the intake port ends to the exhaust port ends at the time of charging. At about the time of intake port opening, where a muffler is used, the end of the muffler pipe next the cylinder may have less than atmospheric pressure owing to rapid exhaust expansion and exhaust ejector action, and this low pressure area may, and I believe often does, supply itself partly with fresh charge, of course, wasting whatever fuel it robs from the cylinder. In one case a 2-cycle motor strong at 3000 R. P. M. was changed as to power to 275 maximum R. P. M., with almost no power at all by merely sloping the piston top towards the exhaust and rounding the deflector top edge, which gives support to practice of considerable separation between intake and exhaust port ends. I think the bottom inside deflector corner should be filled by a radius of at least ⅜ in. Your sketch seems intended to show this corner square.

I do not at all fancy the plan of mixed water cooling and direct air cooling. The 2-cycle cylinder does not require much more than half the 4-cycle cooling effect, same general dimensions, though the 2-cycle burns double the 4-cycle number of charges in the same number of revolutions, because the burning charge is retained less time with the 2-cycle, and the 2-cycle exhaust is less obstructed, hence more sudden expansion and heat dissipation. I have seen a 2-cycle 4-cylinder motor cool perfectly, copper cooling flanges, corrugated, set in the mould and the gray iron cylinder walls well united to the copper flanges by flowing the melted metal through, no fan whatever. I believe integral cooling spines more effective than any form of cooling flange.

If you make the cylinder bore traversed by the packing in two parts will there be a certainty of truly cylindrical form while working?

I would prefer complete individual cylinders, which would be as light and would have no more machining operations than you propose.

I wholly approve your deflector construction.

There is no rule for 3-port third-port dimensions known to me. The third port is a balancing of disadvantages against each other. The automatic crank box intake valve is more to my liking.

You should have much more than 20 H. P. What would you expect 12 cyls., 4 cycle to show?

The 2-cycle can show 1½ to 2¼ times as much power as the 4-cycle, same size and speed according to design.

My preference is for friction drive, combining the clutch and speed change.

H. D.

## 2-CYCLE OPPOSED SMALL CAR

[188.] Perhaps there are a few readers of "The Cycle and Automobile Trade Journal" who would be interested in my idea of a small gasoline engine for light vehicle use and if you will grant the use of your paper for a few questions and answers will forward you a print of my machine later.

The machine is to be two-cycle, two-cylinder opposed, 3½x3½ bore and stroke, crank shaft set to 180 deg. or both cylinders firing at the same time. The entire machine to be as near as possible to the simple two-cycle, two-port type with crank box compression. The cylinders and half of crank box to be cast in one piece, to be air cooled with ordinary cooling flanges and fans. Speed not to be over 800 rev. per minute and less if practical.

Will you kindly answer the following questions applying to the above:

What would be the size of crank-shaft, weight and diameter of fly wheel, inlet, and exhaust port areas, their relative position to piston travel; would not 65 pounds be ample compression. About what H. P. would such a machine develop if properly built?

SAN FRANCISCO, CAL. C. W. HAYWOOD.

I do not favor an opposed 2-cycle. They can be all right at first but as soon as one connecting rod wears a little the engine on that side gets more mixture than the other and they will not run evenly. It is impossible to design engines in these columns. Read the 2-cycle information in these columns for the past year or two and you will have all your questions answered. Sixty-five pounds is high enough compression, 1¼ shaft will do but larger is better. The kind of material counts also. Fourteen inch fly wheel weighing 40 pounds will serve. You ought to get 10 H. P. or more, 800 revs. is very slow for so small an engine. See answer to 210.

C. E. D.

## 2-CYCLE ENGINE QUERY

[230.] As a reader and subscriber of "The Journal," I have been very much interested in your answer column. Especially two-cycle section. Have been working on design of a two-cycle motor for a year. It is a 5-in. bore by 5½-in. stroke. Piston is 6¼in. long with three rings at the top end.

Connecting rod is 9 inches from center to center. Diameter of piston pin is 1 inch. Diameter of crank pin is 1½ inches. Crank shaft is supported in three places, each place having 4 inches of bearing surface.

Intake and exhaust ports are run through 90 degrees, that is, the ports go one-fourth around the cylinder. Intake is ⅝ and exhaust is ⅞.

In your opinion what H. P. will it develop and how many R. P. M.?

What diameter fly wheel and what weight would you use? Do you think an oval cylinder head is better than a flat one?

What oiling system would you use?

I am forwarding you in this mail a drawing of this engine from which you can see the design and arrangements of the parts better than I can explain them.

HANOVER, OHIO. D. P. CAMP.

Your design in general is all right. Make the deflector ends fit close to the walls of the cylinder and turn the deflector straight up. The new gas must not get a chance to cut across to the exhaust port as is their tendency. You have too much weight in the piston.

Make the fly wheel large and so save weight. You ought to get about 10 H. P. per cylinder. A cupped head is stronger and may be lighter than a flat one and has less wall exposed to the hot gases than an engine with same capacity and flat head. Feed the oil with the fuel. This is the only way to feed a 2-cycle.—C. E. D.

## FLUSHING THE LUBRICATOR

A lubricator in which pressure is maintained by connection with the exhaust pipe gradually accumulates particles of soot, which find their way past the filter usually interposed in the pressure connections, and in time probably clog the filter itself. In addition to emptying the lubricator and washing with kerosene, it is frequently well to flush the sight feeds and oil distributing pipes also; and this is easily done where pressure can be put on the same without running the engine—which, if continued for more than a few moments, would be rather dangerous to the bearings and pistons. Sometimes it may be necessary to make a special fitting for the filter opening so that air can be pumped in with a tire pump.

# The Atlas

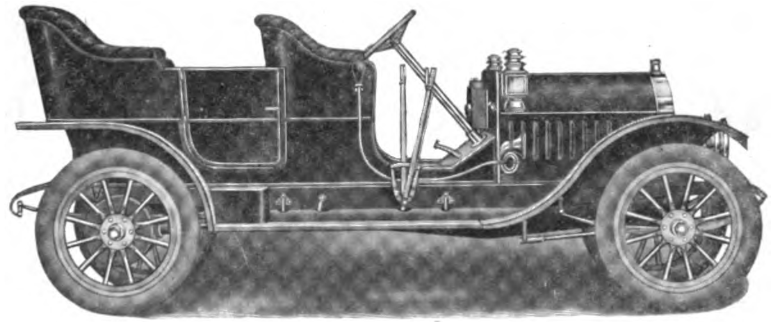
TWO
MOTOR CARS
CYCLE

# Three-Cylinder Touring Car

is equipped with the Atlas two-cycle simple, Flexible, Efficient, Indestructible Engine. The 3-cylinder two-cycle Atlas engine has the light multiple impulses of the six-cylinder four-cycle type without any of its complications or rapid deterioration. The numerous poppet valves, valve shafts, adjustable bearings, cams, springs and dozens of other small breakable, wearable parts are completely eliminated in the Atlas.

## The Engine is Practically Indestructible

The 1909 Touring Car has pressed steel frame. 110″ wheel base, geared pump, geared oiler and geared fan, Atwater Kent ignition, ¾ elliptic rear springs, 34 x 4″ tires, aluminum body, handsome lines, extreme ease of riding, full equipment of lamps and generator or tank; price, **$2,000.**



## The 1909 Line

**2-Cylinder Runabouts**
**3-Cylinder Runabouts**
**3-Cylinder Touring Cars**
**Town Car**
**Taxicab**
**Delivery Wagon**

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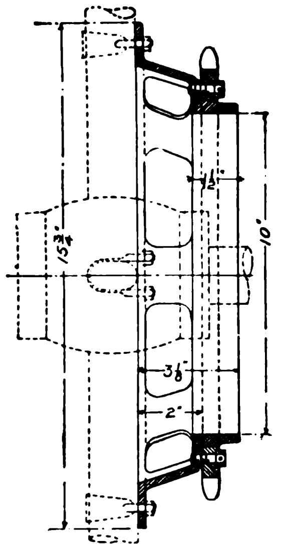
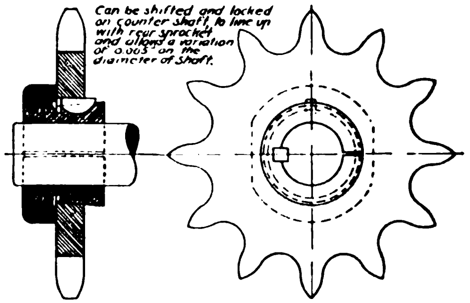
**NEW YORK OFFICE, 1876 BROADWAY**

*SEND FOR CATALOGUE AND TWO-CYCLE CATECHISM*

# CULLMAN Co's SPROCKETS


15¾"
10"
1½"
3⅛"
2"

No. 2. REAR WHEEL SPROCKET & BRAKE DRUM.
PATENTED.
CULLMAN WHEEL CO
CHICAGO. ILLS.


Can be shifted and locked on counter shaft, to line up with rear sprocket and allows a variation of 0.005" on the diameter of Shaft.

DETACHABLE COUNTER SHAFT SPROCKET.
PATENT APPLIED FOR.
CULLMAN WHEEL CO
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# *and* DIFFERENTIALS

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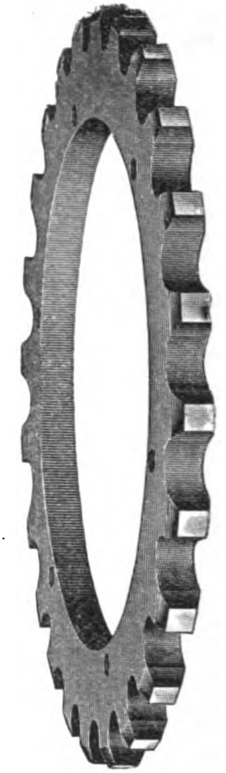
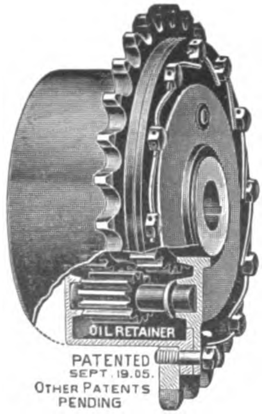
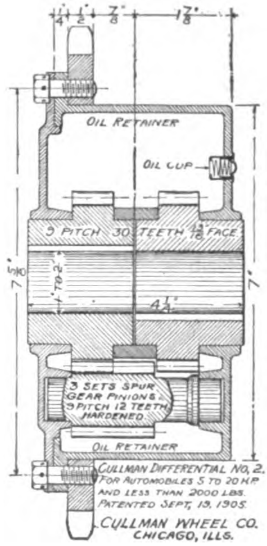



OIL RETAINER
PATENTED SEPT. 19.05.
OTHER PATENTS PENDING


¼"
½"
⅞"
1⅞"
OIL RETAINER
OIL CUP
9 PITCH 30 TEETH 13/16" FACE
7 5/10"
70.2"
7"
4¼"
3 SETS SPUR GEAR PINIONS 9 PITCH 12 TEETH HARDENED.
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CULLMAN DIFFERENTIAL NO. 2.
FOR AUTOMOBILES 5 TO 20 H.P.
AND LESS THAN 2000 LBS.
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# Opinions and Suggestions

**Under the above heading we will be pleased to publish letters from our readers expressing opinions, stating how they have overcome difficulties, or making useful suggestions. In this department will also be published longer communications or articles, of either a general or technical nature.**

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## A COMMUNICATION

**The following is a communication from a doctor outlining his views on an ideal car. As the ideal car for a doctor would also be ideal for many others this communication is herewith published and criticism invited.**

### A DOCTOR'S IMPRESSIONS OF AN IDEAL CAR.

May I express my impressions of an ideal car?

Three cylinder, 4-inch bore, unit casting, 2-cycle, thermo-syphon cooled, exhaust ports full circumference except bridges, fuel injected, stroke of motor to be determined by experiment.

Crank case, transmission case, oil well, transmission case supports, etc., unit casting.

Fly-wheel on working side of motor, enclosed multiple disc clutch. Four sets of non-adjustable H. B. ball bearings on crank shaft bearings to be at least two inches wide, each one to consist of three rows of large balls and cages.

Lubrication splash, to be governed by mechanically operated pump to carry oil from oil well in base of crank case, to crank case, then by over-flow pipes back to oil well. Bottom of pistons to have brass gutter to facilitate cylinder lubrication. No sight feeds to dash or other pipes to carry oil.

Atwater-Kent sparking mechanism, two sets of dry cells, is an efficient and simple sparking outfit. Roller bearings in rear axles, balls in front axles, full ball bearing transmission. Shaft drive, one universal joint at crank case. Power plant installed almost on a line with shaft. 36-inch wheels, M. & R. shoes, Dow inner tubes, detachable. Rims, sizes to be ½-inch larger than recommended by the manufacturer of the shoes. Radiator set ½-inch back of front axle, rear end of body ½-inch forward of rear axle. Wheel base about 10 inches.

Half eliptic springs front and rear, auxiliary spiral springs at the rear shackle of the front spring, rear spring the same but with a cross spring at rear to come in action when the passengers exceed two in number.

Steering wheel at the left side of the car, levers middle of car between passengers. Absolutely nothing to extend outside of chassis except mud guards and step and speedometer tube. Mud guards to be continuous with body and beaded on edge. Step to be open metal work to be used as a mud scraper. No battery, gas tank, tool box or shoes to be carried on step, or outside car.

No brass work. Aluminum hub-caps, horn or whistle under hood or out of sight. Black or oxidized lamps. Plain upholstering, leather not tufted on back or sides. Rubber pneumatic seat cushion, same color as the leather back.

Dash to be gasoline tank with extensions for supporting the carburetor under the hood, and speedometer on the other side. Carburetor adjustment from the dash. Laminated wood frame. Inclined steering knuckles. Foot levers to have ½-inch flange on either side. Corrugated aluminum floor boards, inclined at front third.

Thin steel bodies with beads for reinforcements. Body set low—in fact, floor of car to be some inches below top of frame. Locker under rear seat for tools, etc. Shoe holder or case to be swung on brackets under rear of car.

Color scheme green with light striping or color that least shows dust. Batteries carried in box, so constructed, that connections are made as soon as cells are dropped in.

One modification of the foregoing might be allowed,—a self-contained make and break ignition outfit with magneto.

Hood made to slide in grooves that will hold it snugly, with a simple locking device. Cap to radiator hinged. Two brakes —internal metal to metal expanding on very large size rear wheel drums, in conjunction with throwing out of clutch, and transmission contracting metal lined brake, both foot operated by push motion.

When clutch is thrown out, throttle to be closed at a pre-determined point, to avoid racing. A small lever to carburetor will do this to my satisfaction better than a governor.

Fastening by keys, does not appeal to my mechanical instincts. Attach fly-wheel and rear driving wheels to eight-sided shaft and lock with screw cap. A small hole through cap and shaft admits a split pin, so one can feel assured they will "stay put."

Three point support for power and transmission. Universal joint dust proof. Motor and transmission case also dust proof, no dust pan.

It has occurred to me that solid graphite would be a dandy medium for casting; that surfaces would come out highly polished. Chas. Duryea, Hugh Dolnar, and Dixon Graphite Co. on the job please!

My ideal of a cooler is a series of ribbed tubes, rigidly bound, flexibly mounted. Therefore, this is the type I would incorporate in preference to honey-comb.

Body, steering column, and small parts enamel baked, like old Cleveland bicycle.

You could hit it a crack with a hammer, and it would not chip.

One search-light, very very powerful, its rays to be restrained within a certain radius. Gas to be taken from large Prest-O-Lite or similar tank, controllable at seat, tank to be out of view. Bumper at front, enamel or oxidized. Car geared not less than 4 to 1 on high with standard, options to be had. If make and break ignition is used, a retarding device should be placed alongside the starting handle, or be automatic.

Under no conditions would I tolerate a vibrating coil, or water pump.

A drop in frame, fore and aft would give low centre of gravity and rakish appearance. Perhaps, with this double drop, a steel frame would be better.

Above all, car must run quietly, yet not be muffled to sacrifice more than two per cent. of efficiency which is easily possible, and very probable in the near future.

Every nut on car to have a split pin through it and its bolt. Standard threads to obtain, and due consideration given to variety of sizes when being designed.

Spring retained pet cocks in crank case and oil case. Printed instructions pasted on bottom of front seat, specifying oil or oils especially adapted to lubricating this particular motor.

Carburetor to have the stamp of Chas. E. Duryea's approval. Gasoline pump to have Hugh Dolnar's approval.

Throttle control on top of wheel pointing to left side. With highly efficient make and break, no spark control outside of retarding for starting need be used. Shock-absorbers have my confidence—so I would have them.

My convictions of the merits of the foregoing assembly are so strong, that, had I the opportunity of identifying myself in the sales department of a firm manufacturing a car approximating these specifications, I would give up my practice to do so on a commission basis.

As I have relieved myself of these pent up thoughts, I feel better.

BROOKLYN, N. Y.

GEO. L. MOFFATT, D. D. S.

## A TREATISE ON LUBRICATION

[184.] I read with interest the articles on lubrication in the last issue, especially the one by C. E. D., in recommending the splash above other systems. I think that the splash system cannot be beaten. All parts are oiled on the inside of engine, provided the oil is kept high enough for bottom of rods to hit. In this article he states about using oil with the fuel. As I understand it, he means to mix it with gasoline in tank; but a much better way, in my opinion, is to put in oil cup a feed just inside the carbureter, or inlet pipe manifold. In our shops for the past five years we have done this on all motors, with the owner's permission, and it works well on both auto and marine motors—in fact some owners claim it will oil all parts of the engine. This is the case on two-cycle engines. One oil feed placed on the inlet pipe or manifold of a two-cycle will oil all parts, and one will be surprised how little will be used by this method. If used on a two-cycle engine with a number of cylinders, and if the manifold is made as some are, so as to make the gas travel an equal distance to all cylinders, and if the manifold has any pockets on it, the gas and oil will condense and cause all kinds of trouble; in fact, you will get such an accumulation of gasolene and oil that it will be impossible to start the motor with a manifold designed this way. On a four-cylinder engine this is not so noticeable, but with a manifold made in this manner it is best to place the feed close to the inlet valves. On a four-cycle engine using this feed and using the splash system, one will seldom have to put any in the crank case, as enough drops from the cylinder walls to keep the oil at its proper height. Some people object to this method, saying it will fill the combustion chambers, or valve heads, with carbon, clog the valve stems, etc.; but this is not the case. On examination of a motor after long using, little or no carbon will be found on any parts. On the head of the inlet valves a soft carbon deposit will sometimes be found, but can be scraped off with the point of a pocket knife. In fact, I have seen motors that had a hard carbon scale that was almost impossible to scrape off, but after a few weeks' running with this method of oiling, the carbon would be almost entirely gone. This is also the best way to feed dry graphite to a four-cylinder engine, and with the best grade of the finest pulverized graphite it can be fed almost continually through the inlet pipe; but if used with oil a lot of it drops to the bottom of the bends and horizontal sections of pipe, or manifolds; but if used dry, the oil being cut off, most of it will go into the cylinders. If too much is used on a jump spark engine there may be trouble with the plugs. On a two-cylinder engine, graphite fed in this manner will all be found on the bottom or side walls of the crank case. Another point I noticed in using this fuel on a high speed two-cycle engine is that after running some time the engine is warm all over, especially the crank case. If, after stopping the engine, it refuses to start again for some little time, it is probably due to using too much oil through the feed. Most owners of this type of engine have noticed how hot the crank case gets, sometimes so hot that one cannot bear the hand against it. This is probably due to the heat of the engine itself, and to the almost constant compression of the charge in the base. My theory as to why the engine will not start after being stopped when so warm, is that oil from the feed goes into the crank case in the form of a vapor, and after the engine is stopped holds this gaseous form due to the heat of the crank case, and makes a heavy, rich gas that is hard to ignite, but if left to stand long enough to cool off it will start on the first turn of the wheel. This only happens when too much oil is used. I tried this on three different makes of high speed two-cycle engines, arriving at the conclusions stated. I may be wrong in this, and would like your opinion on same. In overhauling motors with which owners claimed to have lubricating trouble, most of them have mechanical oilers, and in nine cases out of ten it is due to the owner's neglect. Very little trouble is experienced in summer time, but in winter some oilers are so placed that the oil becomes chilled, making it so thick that the pump cannot handle it, and it is a common sight to see the sight gauges gradually fill up with oil, which shows that the engine is getting little or none. I have noticed this more on the mechanical oilers than those worked by compression or air pressure. I believe that all mechanical and compression oilers should have some means for heating during cold weather, and the small pipes or tubes from them should be kept as near the warm parts of the engine as possible. If this were the case owners would experience less trouble. The above is open for criticism from anyone, as it is simply my own opinion, from my own observations of the past eight years.

NEW YORK, N. Y. J. C. REPAIRMAN.

## MY EXPERIENCES WITH COILS

A Communication.

After reading "A Communication" in the November issue of The Journal by C. D. Voorhees, I wish to give some of the experiences I have had with jump-spark coils, as they may be of value to other Journal readers. It is small wonder to me that he found a coil on the small four-cylinder machine that would require a new set of cells after 100 to 150 miles running. Thirteen months ago I ordered a rather low-priced single coil from one of the most prominent (judging by the way he advertises) coil makers. It was guaranteed to operate perfectly on 3-10 of one ampere, with a 6-volt battery. On receiving the coil I put a coil current indicating ammeter in the circuit and found that the vibrator was adjusted to consume about 2 amperes, yet the maker had written that he would guarantee the coil to operate on 3-10 of an ampere. Adjusting the vibrator to use less current proved an unlooked for revelation. The coil would not make a spark on less than one ampere of current, and when so adjusted would not run the engine, but had to be adjusted to use about two amperes to make the engine run satisfactorily. After about 500 miles running I found that something was radically wrong, though for a while did not know just what, for I hadn't the slightest idea that a supposedly first-class coil would become so that it was no longer able to make sparks strong enough to fire the charges, without some kind of abuse. Yet, that coil did that very thing, and the only thing that could have ruined it was adjusting the spark plug points to be 1-16 inch apart. I supposed the coil had been injured by some means unknown to me, so ordered another from the same maker. It came adjusted to use about two amperes, and would not run the engine properly on less. After a couple of months it was in the same fix as the first. I began to take notice of that make of coil, and have since then examined a number, some brand new, and others on automobiles just from the makers' hands, and have yet to find a coil of that make that will operate the engine on less than about two amperes of current, yet the maker guarantees his coils to work perfectly on 3-10 of an ampere.

Again, I find that this make of coil refuses, almost invariably, to operate the engines after about 1,000 miles. They are cheap in first cost, which I suppose explains why they are used by so many makers of autos, for I see them on a great many cars, and know of but one single coil of the make that gives even ordinary satisfaction after 1,000 miles running. Now note the contrast with the following:

Last May I was informed by your Mr. Duryea that certain folks were good coil makers. So I ordered one of their coils, although higher priced and also guaranteed to operate on very little current. If a coil was ever abused unintentionally, this one certainly has been, yet it still runs my engine, which is a 3-cylinder, 4-cycle, far better than a new coil of the first make, though the abused coil now has to be adjusted to use from ¾ to 1 ampere. The abuse happened in the following way, impossible on a car not equipped with two distinct systems of ignition. My engine was originally fitted with make-and-break ignition, but as nothing is free from occasional trouble, I put in a jump-spark system for use when the other went wrong. Either of the systems could be used at will, or both together, there being no connection between the two. The single coil was used in connection with a distributor, but once the switch was forgotten and left in the position that caused ignition by jump spark. The make-and-break got its current from a magneto, so was used all the time. The end of cable where it connected to the distributor worked loose, and the car was run at least 100 miles before this was discovered, which was when the make-and-break got sick. All this time the coil was forcing its secondary current into air, the loose cable not being closer than two inches to any part of the car that would act as a ground for the current. From what I have learned about coils, this was a very severe treatment, and the only wonder to me is that the coil still operates the engine at all.

One thing is certain. The coils first mentioned will not last the one-hundredth part as long under same treatment, and I have gone to the trouble to demonstrate this by using some units that were found to be weak. After an hour's buzzing with no ground for the secondary connection, they would not fire any sort of a charge, and would not jump a gap at all, no matter how short it was.

Up to the present time I have found no coil so good and reliable as this second one, and were I buying a new car would insist on this make being put in regardless of the fact that they cost more than other coils, and I would want a coil for each cylinder, for you never know when a distributor is going to lay down. I see many complaining about having trouble with sticking vibrators. Now it seems to me that if a coil has to use from two to five amperes of current to get along, then the vibrator points burn off a great deal faster and are more liable to stick than if a coil was used that actually used but 3-10 of an ampere.

Before I got the second coil I had to doctor stuck vibrators, but since receiving it I haven't had any of that to do, but it really used but 3-10 ampere before being abused, and from ¾ to 1 ampere since.

With the engine running perfectly when using the abused coil (and by perfectly I mean not missing oftener than one explosion in fifty) a new coil of the first mentioned kind was tried and the engine promptly stopped, nor could it be started again till the needle valve controlling the amount of gasoline used was opened a trifle, to let more fuel through, making a richer mixture, showing that, though new, the coil was not capable of producing as hot and strong sparks as the old unit that had been abused for more than a hundred miles. If the public knew enough about coils to know what they ought to do and how to test them and learn for themselves if the makers' claims were fulfilled or not, certain makers would either have to make better coils or go into some other line to make a living. But there is a fairly accurate way for even the ignorant to know and judge by, and that is to form an idea by the price asked.

LAMPASAS, TEXAS. TOM HULING.

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If a headlight throws its flame too high the trouble, in all probability, is due to clogged burner openings.

## WHAT THE TROUBLE WAS

[192.] I find much in the query department of your Journal to interest me. I had a similar experience with a six-cylinder motor in firing back through carburetor as Mr. J. Donald Gibson, in the November number, and after some trouble located it in a partially blown-out jacket on the inlet manifold which caused a weak mixture.

With another six-cylinder I had an experience which bothered me worse. The motor began to fire out of the exhaust at irregular intervals. It being a Railroad motor car and circus day it had to go; still I spent all odd moments trying to locate it. I was asked what caused it, but that was what I wanted to know. The answer I gave was one cylinder missing and one of the other cylinders firing the charge in the exhaust pipe. I inspected magneto, spark gap and cleaned plugs, inspected wires, carburetor adjustments, gasoline and gasoline pipes for dirt, gaskets on manifold and put kerosene on valve stems to cut gummed oil off, took needle point out of carburetor to see if any waste had lodged in top of nozzle, and that night reground the twelve valves, and next morning it banged worse than ever. To be doing something, I took the carburetor off and took it apart, and there I found the spring to the by-pass valve up in the inlet manifold. It is pretty hard to say how it got loose, but putting it where it belonged brought the mixture right and stopped the noise.

FREEPORT, ILL. A SUBSCRIBER.

We thank you for this interesting communication. Let us hear from others of our readers.—Ed.

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## DOES GASOLINE ATTACK GALVANIZED IRON?

Extracts from a communication to the Editor stating results of tests to determine this point:

We have run up against some surprising facts in our chemical research for the cause of the action of gasoline on zinc and galvanizing.

We were aware and have always known that pure gasoline will not attack any metal, but we knew from the action that we had observed within the last five or six years that there was some foreign substance in gasoline that positively would attack zinc, but yet did not attack tin and will say in our going into the matter we have found the cause but have not our proofs as yet in such a way as to draw a positive conclusion. However, will say that a great percentage of gasoline we have now is not the regular distillation of petroleum, but is manufactured gasoline from the heavier oils.

At present we will only say that it is the acid in the gasoline that attacks the zinc. This may be citric, sulphureous or sulphuric, but nevertheless, after it is poured through the air into the tanks and shaken around, there is no question but what some sulphuric is shown, which very readily attacks the zinc and causes the action which we have described.

JANNEY STEINMETZ & CO.

(We would like to hear from others in regard to this interesting subject.—Ed.)

### WHAT THE TROUBLE WAS

[198.] In regard to my inquiry, No. 177, concerning the trouble I had with my car with the water freezing, I find that in trying to crank the machine I stripped part of the gear which operates the pump and timer, which changed the spark timing to such an extent that it would never have been possible to have the engine running properly.

I thank you for the answer to my inquiry and trust that this information will be of some good to some other unfortunate.

CINCINNATI, OHIO. GEO. JABERG.

### ANSWER TO NO. 151

[213.] I have just received my copy of The Journal and find that Mr. Johnston, in question 151, page 80, December issue, has had about the same trouble which I experienced a few weeks ago. At first I thought that the trouble was due to water in the gasoline, but decided to make a thorough examination of the gasoline circuit and found that the feed pipe from the tank had become plugged by the accumulation of minute strands of chamois which had evidently come from the strainer through which the gasoline was poured into the tank. If Mr. Johnston strains his gasoline his trouble is probably due to the same cause.—R. H. B.

### ANSWER TO NO. 162

If S. L., of Carterville, Md., in query No. 162 of your December number, will write to the Motor Car Specialty Co., Lamberton and Lalor Streets, Trenton, N. J., he can get at a very reasonable figure the 4-cylinder motor that he wants to use in his motor cycles.

BUCODA, WASH. G. C. SANDMYRE.

(This engine was described in the October, 1908, issue of "The Journal," page 137.—Ed.)

### THE WRONG SALT

I am an interested reader of the Trade Journal, and through the medium of same have been greatly benefited. But my attention was called to one article, No. 77, page 77, November issue, written in answer to a question of H. E. Bradley, concerning the making of oxygen.

You mentioned that O could be obtained by applying heat to manganese dioxide $MnO_2$ and potassium chloride KCL, thus liberating the O. It is on this point that I disagree for KCL contains no O, and hence it is potassium chlorate $KCLO_3$ that must be used. The KCL is the white solid residue that remains. The $MnO_2$ simply acts by catalysis.

CARBONDALE, PA. W. BURR BENNETT.

## Notes for the Novice

It is well to paint the muffler while it is hot, first cleaning it thoroughly.

It is well the keep the terminals of sparking batteries coated with vaseline or thick grease and so prevent corrosion.

In replacing spark plugs never adjust them too tightly in hot cylinders or difficulty will be experienced later in any attempt to remove them.

It is a mistake to lubricate magneto bearings too frequently. While ball bearings require little oil, they should not however, be overlooked entirely.

Tire casing should be gone over frequently and bits of gravel or metal picked out. The small cuts left should be filled in with strong cement.

Sweet oil and tripoli form an excellent coating to prevent brass work from becoming tarnished. Oxalic acid or vinegar and salt are good to remove stains from the metal.

Keep all the connections of the mixture inlet pipe of a multi-cylinder engine perfectly tight. Slackness at any point permits the entry of a certain quantity of extra air, which renders an operation of starting the engine more difficult.

If the carburetor drips when standing the float valve should be investigated. If pressing it shut stops the dripping, the float is too high. If the dripping persists, the valve leaks and must be ground to a fit, preferably using pumice stone, since emery is liable to embed itself in the brass.

In fitting a speedometer, or mileage indicator, to a car, it is absolutely necessary to have the driving-gears, which are mounted on one of the road wheels, exactly centred on the latter, otherwise the gears will wear quickly and will also be noisy.

One of the most common failings of the amateur autoist is to resort to the pipe wrench or the gas pipe pliers to loosen a refractory nut or connection. Such tools only grip by sinking into the metal, and the slightest slip means an abrasion that cannot be remedied.

When putting a car in commission and occasionally, say every month or two, the interval depending on the amount of use the car is given, the hub caps should be thoroughly cleaned out, all the grease and verdigris removed, after which the caps should be repacked.

## AIR BOUND WATER SYSTEM

The fact that a small amount of entrapped air in the water circulating system can cause much trouble does not seem to be appreciated by the average driver. If the water is allowed to get so low that the top of the tubes are exposed, and the system then filled in a hurry, it sometimes happens that a film of air is caught between the tubes. Usually the action of the pump is sufficient to dislodge this bubble, but occasionally it gets into such a location that a partial or total stoppage occurs and the circulation becomes airbound, with the result that the engine overheats. In filling the radiator when low it is well to pour the water in a thin stream with the engine running, or open a drain at the lowest point and continue pouring until a continuous flow of water indicates that the air is all out of the system.

In cold weather such air bubbles sometimes prevent the system from completely draining and a freeze-up in what was supposed to be an empty water system is the usual result.

## TROUBLE CAUSED BY LOOSE MUFFLER BAFFLE PLATE

One of the most difficult knocks to locate in an automobile is that caused by a loose baffle plate in the muffler. Such a plate will hammer practically in unison with the motor and is extremely hard to find.

The attention of the writer was once called to a case of this kind in which, however, the knock was not the troublesome feature. The muffler in question contained alternate plates, having holes around the circumference or a large hole in the middle. At slow motor speeds everything works properly, but just as soon as the engine speeded up a little trouble began. The motor would slow down, apparently shocked. This was caused by the pressure in the muffler at high engine speeds forcing the loose plate against the next which had the central hole and thus absolutely choking the exhaust until the engine slowed

## INDICATIONS OF CARBURETOR TROUBLES

When it is thought that the carburetor needs adjusting the following symptoms may be noted: Black smoke, together with red flame, shows that the mixture is too rich; yellow flame, shows it is too weak; blue flame, together with clean exhaust and a well-emphasized note from the muffler waste pipe, indicates the correct setting. Similarly back firing in the engine manifold may be taken to show too weak a mixture, and muffler firing one which is too rich. A pronounced shuffling at the air intake or a sharp whistle is apt to show a restricted air opening, even though the usual indications may not point to any real difficulty with the carburation. Flooding while the motor is turning may be due to a leaky float valve, a sodden float, too high a level in the float pot or a fuel adjustment thrown too far open, so that more fuel is raised than can be vaporized.

## STEAMER ECONOMICALLY RUN WITH KEROSENE

[218] Thinking that my experience with a steam car may be of interest to your readers I am writing you as follows:

I have run a Locomobile steam runabout 4,500 miles the past summer on a consumption of 350 gallons of kerosene oil.

The burner is a 14-inch F. W. Ofeldt, and Sons kerosene oil burner.

Most of my driving has been over the New England hills, and some of them are very steep, and rough which has consumed a lot of power. My fuel bill has been $31.50 for the 350 gallons of oil at 9 cents been 12.8 miles, but I have obtained at times over 15 miles to the gallon. Last year when I burned gasoline my average per gallon was 8 miles at a cost of 18 cents per gallon. My entire up-keep expense for the season has been $116.50, which includes everything, fuel, oils, tires, repairs, even an accident that cost me $25. This makes an average of 2½ cents per mile for the car.

About one half of the time I have carried two passengers and have never gone alone, making an average cost per mile per passenger one cent.

Kerosene as a fuel for steam cars is superior to gasoline, because it is safer, cheaper and more powerful, also it can be procured at any farm house which is quite a factor.

Yours respectfully,

LEON T. BUNNELL.

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Never attempt to force the gears into mesh. If they will not engage without being forced, there is something wrong, and jamming down hard on the lever is only liable to aggravate the trouble or spring the shifting arm or lever.

Always declutch at corners. While it is a wise plan to declutch when rounding a sharp corner, merely as a precautionary measure, to prevent dangerous skidding; it also has a beneficial effect on the tires. Whenever the car tends to skid, due to its deflection from a straight course, a cross strain is brought to bear on the tire treads which is directly proportional to the square of its velocity. If the power is applied while rounding the curve, the tendency to rip off the tires is further aggravated by the backward drag due to traction. If the clutch is released, however, that factor is removed, and the strain thereby is reduced to its minimum amount.

# Think This Over Seriously

THE publisher who offers you an incomplete, inaccurate, poorly compiled directory, classes you as one of those for whom any old thing is good enough. ¶ When he accepts your money for advertising space in such a so-called directory he is "**rubbing it in.**" ¶ Those who are approached for subscriptions or advertising by such publishers should **think this over—seriously.** The

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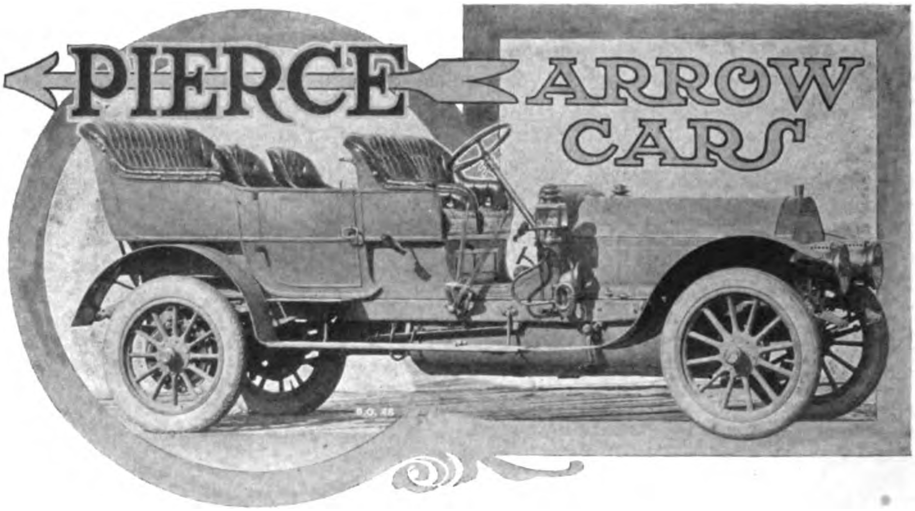

All precedents, where the extent of the range of models to be shown by a single manufacturer is concerned, are to be broken by the George N. Pierce Company, Buffalo, N. Y., in the listing of no less than thirty five distinct models. As a foundation, these numerous types have no less than five separate chassis of which three are entirely new models, the lines and specifications of which have been worked out by Designer Fergusson during the past year. It takes but a glance at them to note that the trend toward the six-cylinder type will be more strongly reflected in the Pierce line than ever, as there are three six-cylinder chassis listed, two of them being wholly new creations embodying numerous new features, while the third is the 60-horsepower Great Arrow that has done so much to uphold the title of the Pierce in endurance contests for the past two or three seasons. The other new model is a four-cylinder town car of attractive lines and rated at 24-horsepower, but the efforts of the entire plant were concentrated on this and the other four-cylinder car, which is the 40-horsepower Pierce Arrow of 1908 with a few minor changes, for some time, with the result that practically the entire series of both these models will have left the works on or before the first of the year. According to Colonel Clifton, who is an enthusiastic six-cylinder advocate, it is quite probable that these may be the last four-cylinder cars to be constructed in the Buffalo factory.

To put it briefly, the Pierce line as it stands at present may be summarized as follows: the 4-24 and 4-40 in the four-cylinder class, and the 6-36, 6-48 and 6-60 in the six-cylinder class. Of these, the 4-24, the 6-36 and the 6-48 represent the new additions for the present season's selling, while the 40 and 60 horse-power, four and six cylinder types, are the 1908 line, the six cylinder member of which is to be continued. The power ratings of these cars are conservative in every instance and are based on the following cylinder dimensions. The 4-24 has a 3 15-16-inch bore by a 4¾-inch stroke, the same cylinders being employed on the 6-36, while the 4-40 is the same as last year, namely, 5 by 5½ inches the cylinders of the 6-48 measuring 4½ by 4¾ inches, while the same cylinders as the 4-40 are used to form this essential of the power-plant of the 6-60.

### DETAILS OF THE NEW MOTORS.

A departure is to be noticed from previous Pierce standards in that twin castings are now employed as the foundation of the motors on the new models, this permitting considerable shortening the total length of the motor. The position of the valves in oppositely placed outboard ports has been retained, however, as have numerous other features that have characterized Pierce design for some years. Roller ends have been adopted for the push rods where they contact with the cams, while their upper extremities have been provided with inserted fibre blocks against which the valve stem rests when lifting, thus reducing the noise from this part of the motor to a minimum. One feature of the motor's construction that may be regarded as a typical example of the extent to which refinement is carried in the Pierce factory to insure the greatest degree of satisfaction in the hands of the user, is to be found in the valve port covers. In place of the usual screw cap, there is used a plain circular plug carrying a combination asbestos-copper gasket on the under face of a shoulder on it. This plug is dropped into the lower valve port opening, directly over the valve, while a second plug, which is threaded, turns very easily into the opening above tapped to receive it. Through a substantial boss cast in it for the purpose, this cap carries a good-sized set screw, and when the cap is home this set screw is turned down on the loose plug beneath, effectively placing both under tension and making an absolutely gas-tight joint that is, at the same time, very easy to open, as once the set screw is released by giving it half a turn, both the caps may be taken out without the use of any tools. The valves themselves are made with cast-iron heads, screwed, riveted and brazed on to the steel stems, and they seat at an angle of 45 degrees. The practice of pinning the cams to the shafts is still followed; the push rods work in renewable bronze guides.

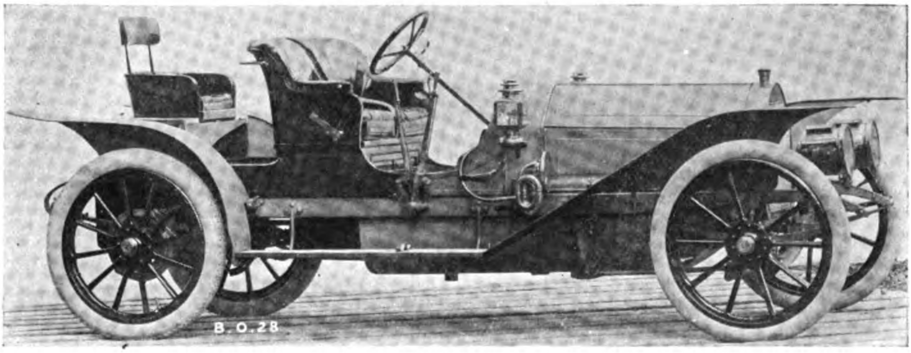

Fig. 1. Pierce Arrow 6-36 Runabout. A new 1909 model, 119 inch wheel base. 34x4 and 4½ inch tires. 6-cylinder motor, selective sliding gear change speed, gear shift levers at the side—a departure from previous Pierce practice. The cylinder bore is 3 15-16 inches by 4 3-4 inches stroke, cylinders cast in pairs—another departure from previous Pierce designs.

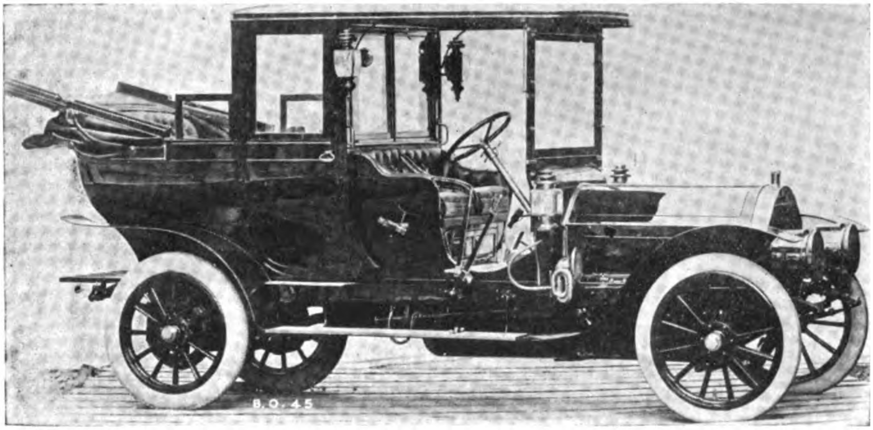

Fig. 2. Pierce Arrow 6-48. A new model with landaulet body, for 1909. 6-cylinder motor, 4½ x4 3-4 inches, sliding gear change speed—four speeds ahead direct on third, selectively operated. 130 inch wheel base. Goodrich tires 36x4 on front, 36x5 on rear, cast aluminum body, special oiling system and other Pierce features are continued.

While on the subject of valves, it may be mentioned that an entirely new type of exhaust manifold has been adopted on the Pierce, experiment having conclusively demonstrated that this apparently unimportant part is capable of considerable improvement. Instead of making the manifold of a single piece, or of the same diameter throughout, it is provided with slip joints between each pair of cylinders in order to prevent the unequal relative expansion of the manifold and the cylinders from distorting the latter, and it is also enlarged toward the rear of the motor. Beside this, its interior is so arranged that the gases issuing from each successive pair of cylinders strike the centre of the flow coming from the cylinders ahead of them, thus setting up an injector action which creates a partial vacuum, tending to greatly improve the scavenging of the cylinders. Tests made at the Pierce plant show the increased efficiency of a motor thus equipped to be fully 5 per cent. greater than when run with a perfectly free exhaust, discharging directly into the atmosphere.

The crank-shaft is a one-piece drop forging of nickel steel, specially heat-treated and showing a tensile strength of 110,000 pounds to the square inch. It is supported on seven bearings of the bronze-bushed type, and both the crank pins and main journals are of liberal length and diameter to insure cool running and long life to the bearings. Connecting rods are of the marine type, drop-forged in one piece, and are provided with phosphor bronze bushes at both ends, the wrist pin bearing being made extra long, while provision for adjustment is allowed at the big end. The timing gears are located outside of the crank case proper at the forward end of the motor, and are protected by a special oil-tight housing. This case is also made to carry the pinions for the special side shafts driving the magneto and pumps, together with their bearings, so that when this forward housing is removed, these pinions go with it.

Aluminum alloy is employed for the crank case, all the bearings depending entirely for their support on the upper half of the casing, or engine bed, the lower part thus serving merely as an oil well. But a departure is to be noticed in that aluminum is not employed as the motor support, two drop-forged members of steel to which the motor bed is attached by four substantial through bolts being employed instead, these transverse pieces being attached directly to the side members of the frame in the usual manner. The pistons are made very light and have webs cast on the inside. The wrist pins are of steel, case-hardened and ground, and are held in place by means of taper set screws. As is the case with the cylinders, crank pins, journals and the like, the pistons are accurately finished by grinding.

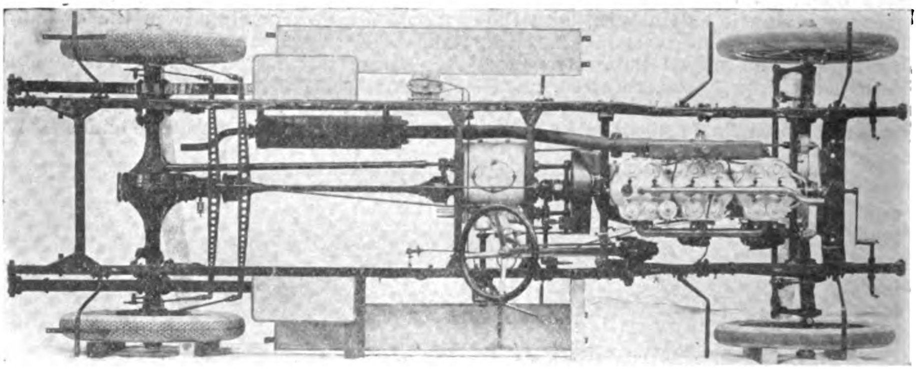

Fig. 3. Plan of the chassis of the 6-48 car, a new model for 1909, showing the arrangement of the engine in the frame, suspended not from integral crank case arms, but on special pressed steel cross members at the front and rear, selective side lever control of the change gears is used instead of the progressive change gear lever under the wheel. Long flat semi-elliptic springs are used, the spring leaves being without a center bolt hole and prevented from longitudinal shifting by the meshing of V-shaped depressions made in the leaves before hardening. Note the large brake eveners and the protected position of the cross rod of the steering gear, which is placed to the rear of the front axle and raised so that it cannot be struck by road obstacles.

THE LUBRICATING SYSTEM.

One of the strongest points of Pierce design has always been the simplicity and reliability of the lubricating system, than which few things are of more vital importance to the life of the motor. This may be briefly described as a constant circulating system by means of which every moving part of the motor is kept continually flooded with oil, any excess being prevented from reaching the combustion chamber by means of baffle plates, through which the connecting rods pass. The system depends for its working upon gravity and centrifugal force, the oil being raised from the crank case well by means of a gear pump driven from a special shaft, to the oil reservoir located at the height of the cylinder heads, and close to them, thus insuring a uniform temperature for the oil supply, regardless of weather conditions. From this tank no less than seven leads are taken, one for each of the main bearings, while an additional blind lead is taken to the dash where it terminates in a sight glass indicating the extent and condition of the oil supply.

The oil has to pass through two sets of gauze screens before finding its way into the tank, thus cleaning it thoroughly every time it is circulated. The tubes forming the oil outlets to the various bearings are made with recessed ends adapted to take fibre washers drilled with various sized holes, so that the oil feed may be varied in this manner if necessary, though the makers have never found any occasion to depart from the standard adopted some time since, which calls for a washer with a one-sixteenth inch outlet. Upon arriving at the bearing, the oil is lead into the drilled crank-shaft and by means of centrifugal force is thrown out on the surfaces of the big end bearings through drilled channels. The surplus drops into the oil pan, where it is utilized through the medium of the splashing of the rods, to lubricate the piston and wrist-pin bearing, recesses being drilled in the top of the latter to catch some of the oil that finds its way up into the interior of the piston, and practice has demonstrated this to be more than is required, though oil is also taken in through the opening of the hollow wrist pin from the cylinder walls. This system has now been a feature of the Pierce motor for six years past. The oil gauge on the dash may be illuminated at night by pressing an electric button.

The shape of the oil tank is such that, regardless of the position of the car owing to the grade, the feed continues uniform, and as the outlets are all of large bore copper tubing and removable wire gauze meshes are provided at every point, clogging is effectively guarded against.

### IGNITION SYSTEM AND ACCESSORIES.

A Bosch high-tension magneto constitutes the service side of the ignition system. It is driven from a special shaft on the right side of the motor and is connected to a set of plugs tapped into the cylinders horizontally so as to cause the spark to occur directly in the path of the incoming charge. As an emergency or secondary system to fall back on, a set of accumulators and a four-unit Autocoil outfit is provided, the timer, of the roller type, being mounted vertically at the upper end of a shaft placed between the fifth and sixth cylinders in accessible position. Drive is from the inlet cam-shaft through bevel gears. The spark plugs for this system are placed in the cylinder heads and as close to the inlet valves as possible.

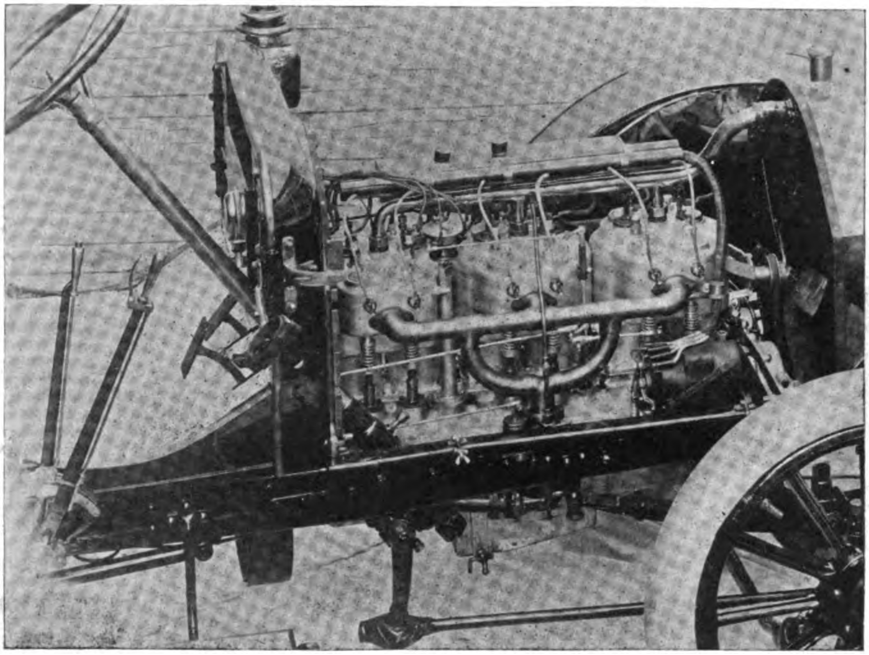

Fig. 4. A 1909 six-cylinder motor in place in the chassis, showing the twin cylinder castings, location of the timer at the upper end of a vertical housing, location of the spark plugs in the sides of the cylinders and the mounting of the magneto on the right. A coweled dash is fitted, which protects the coil. The new arrangement of gear shift levers for Pierce models is shown.

Special interest attaches to the Pierce carburetor for 1909, as it has undergone changes of a nature not hitherto attempted in this country. These relate more particularly to the manner of admitting the auxiliary supply of air and have been adopted with a view to overcoming the inertia effect present in either the diaphragm or piston type of valve. For this purpose, a cylindrical chamber placed to one side of the rotary throttle is employed. In its sides are three vertical rectangular openings in the case of the larger six-cylinder motor, and two on the smaller. These ports extend practically for the entire height of the chamber in question and are closed from the interior by means of reeds attached at their upper ends. Back of these reeds are supplementary springs which serve as gradual stops of increasing tension, coming into action progressively as the motor speed and the suction increase, thus insuring an extremely gradual and regular action. The constant level chamber is placed concentric with the spray nozzle, feed being by gravity, and a coil spring is placed round the float valve spindle in order to prevent jumping or chattering owing to road inequalities. The mixing chamber proper, in which the rotary throttle is located, is now water-jacketed, and provision is made for taking a supply of hot or cold air as the circumstances may demand, the intake being equipped with a gauze screen to exclude the copious quantities of road dust and other foreign material, which when scraped from the piston heads and combustion chambers is indiscriminately labeled "carbon deposits" and ascribed to an excessive supply of oil.

A centrifugal pump of ample dimensions attached directly to the crank case and driven by a separate shaft on the off-side of the motor, serves to circulate the cooling water supply to the honeycomb radiator, and, with its aid, the belt-driven fan supported on a bracket providing an eccentric adjustment, completes the motor accessories.

### TRANSMISSION.

All Pierce cars for the present season mark a radical departure from previously accepted standards where this essential is concerned, as a four-speed selective type of gear-set has been adopted in place of the progressive three-speed box with control from the steering column that so long held its own as a distinctive feature of Pierce design. The leather-faced cone clutch provided with a liberal amount of cork inserts is continued without change, and the spring being of the self-contained type, thus avoiding all thrust when in engagement. A special ball bearing is provided to take this thrust when the clutch is disengaged. Directly back of the clutch is a large double universal, allowing play in every direction; this has been so well worked out that the distance between the clutch and gear box is extremely short, though ample play is allowed for. In fact, no single essential of the car shows so strikingly the high factor of safety entering into the design as does the transmission. This applies particularly to the Hess-Bright ball bearings on which the shafts are mounted, as Designer Fergusson exceeded even the manufacturer's specifications where the size of the bearings necessary was concerned.

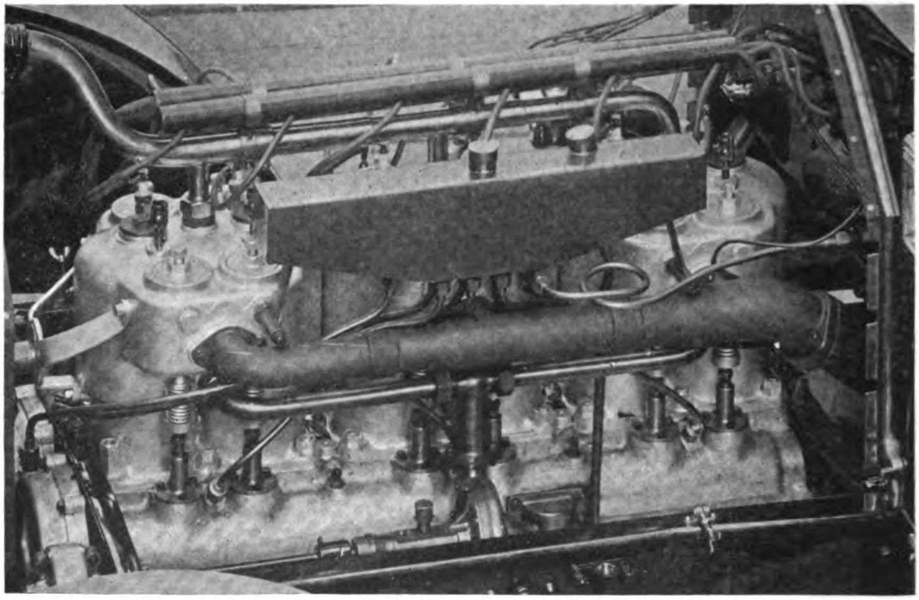

Fig. 5. Exhaust side of 6-cylinder Pierce 1909 motors, showing the location of the oil tank above the exhaust pipe, where it is kept warm, and the seven leads to the various parts, including a blind lead to a sight feed glass on the dash. The muffler is arranged on the ejector principle, so that it is claimed the motor shows greater efficiency with this muffler pipe than when exhausting into the air. The 1909 motors have cylinder dimensions from 3 15-16 inches bore, 4½ inches up to 5 inches. In each case the stroke is longer than the bore.

The fixed gears are securely bolted to flanges made integral with the lay-shaft, it having been found that much better results are obtainable by making and hardening the gears separately, as it is impossible to prevent more or less distortion where the gears and shaft are made in one piece. Four speeds and the usual reverse are provided, the ratios, i. e. of the gear-set alone being 3.54 to 1 on the low, or first, 2 to 1, on the second, and 1 to .75 on the third, while on the reverse it is 4.56 to 1. Specially heat treated chrome nickel steel is employed for both the gears and the shafts. Direct drive is on the fourth speed which is brought into engagement by means of a usual type jaw clutch.

### THE CONTROL LEVERS.

Control follows more or less conventional lines in the shape of the H-sector and single side lever, the gear shifting bars being retained by means of the usual ball and spring, but the interlocking device as well as a special safety lock when the gears are in neutral have been well worked out. This takes the form of a quadrant with holes drilled at appropriate intervals to permit a pin to drop into them, thus preventing any attempt to mesh one gear while another is engaged, while a stop effectively prevents the clutch being engaged before the gears are in proper mesh, and in a similar manner the operating lever is locked in the neutral position and the clutch is held partly out of engagement. This provides an excellent safeguard against disaster in case the driver has left the car with the motor running and the ubiquitous small boy begins to play with the levers, as is so often the case. In order to take the hand lever out of neutral, it is first necessary to disengage the clutch entirely and this cannot well be done except by getting into the driver's seat.

### THE REAR AXLE ASSEMBLY.

Directly back of the gear set is a large universal of the cross-pin type, while at the other end of the propeller shaft is a combined universal and telescopic joint, thus permitting of longitudinal movement of the shaft itself when the springs are depressed to a point that renders this necessary. A spur type of differential is employed, three pairs of pinions being used. They are housed together with the driving gear in a cast steel casing forming the centre of the rear axle support. But while a live axle is employed it is of the fixed type being rigidly fastened at its ends directly to the wheels. The shafts are of heat-treated chrome nickel steel and taper toward their outer ends, the increase in section being fully 25 per cent. The wheels are attached directly to the axles by means of Woodruff keys. Annular ball bearings are used throughout, the thrust of the large bevel being taken on an independent bearing, so that it is impossible for the bevel gears to be drawn out of mesh by wear on the driving axle bearings.

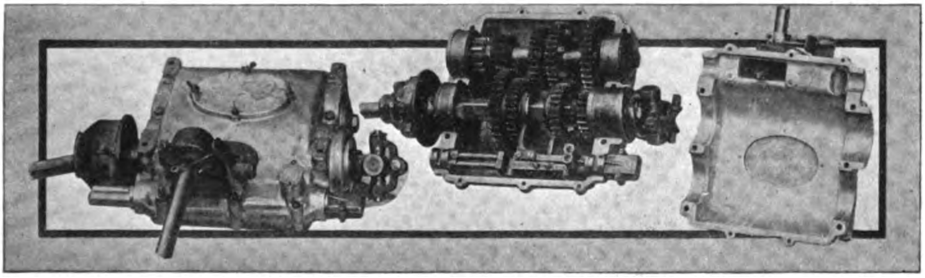

Fig. 6. 1909 change speed mechanism of Pierce Arrow cars. For this year a four speed selective operated change speed mechanism is used, mounted on annular ball bearings of extra large size. The progressive control lever under the wheel has been superseded by the selective gear shift lever operated in a conventional H grid at the side.

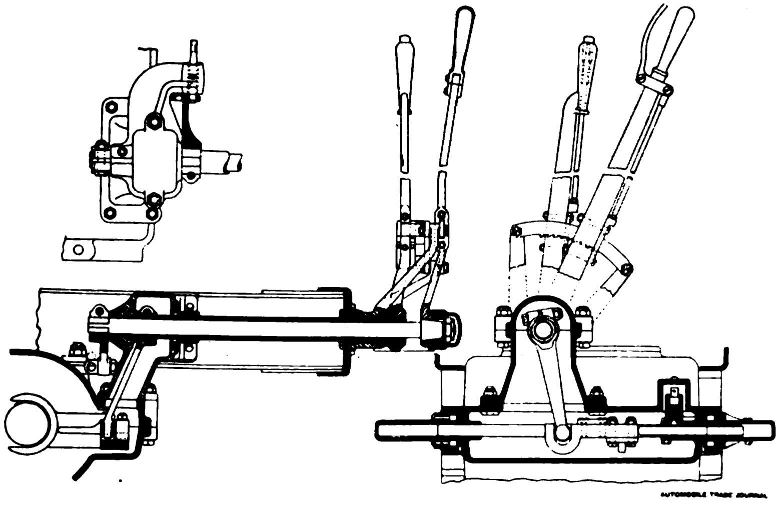

Fig. 7. Assembly drawing of the Pierce Arrow 1909 gear shift lever and quadrant. This lever is of the conventional selective type, as shown.

The brakes are centered in large steel drums attached to the rear wheels, the service brakes consisting of the internal expanding set, which are interconnected with the clutch, while the emergency brakes comprise the external contracting pair which operate independently, thus permitting the motor to be used as a brake. The shoes of both sets of brakes are pivoted at their lower ends and are lined with Raybestos, operation being by means of a toggle action. An extremely liberal amount of braking surface has been provided and each set of brakes is equalized by means of an evener the full width of the frame.

### SPRINGS.

Standard channel section pressed steel frames are employed in all the models, but in the 4-24 and 6-36 these are of the drop type in the rear to permit of a three-quarter elliptic spring being used for suspension at that point, the forward springs being of the flat semi-elliptic type on all the models, while springs of the latter class are also used all round on the 6-48, the 6-60 and the 4-40 models. The front axles for all are onepiece drop forgings of a simplified type in that the steering yokes are made integral with the front wheel spindles instead of with the axle as is customary, while the axle itself is in the shape of an inverted arch of large radius, thus avoiding the sharp bends necessary to make the usual drop required to clear the crank-case. The steering knuckles and spindles are nickel steel drop-forgings, held to the axle by means of a large tapered nickel steel pin which is retained in its place in the axle end by a set screw. In connection with the suspension just mentioned, an apparently slight though important innovation has been made by doing away with the necessity of a retaining bolt and the corresponding requirement of drilling the spring at its centre to hold the leaves together. This has been accomplished by punching up a boss at the centre of the spring leaf when soft, this raised portion dropping into the recess caused by the formation of the boss in the leaf below, thus locking the assembly of spring leaves against longitudinal movement. The necessity for drilling the spring leaves at this point for this purpose has always tended to greatly weaken the spring besides considerably shortening its life as the majority of spring breakages were found to occur there, so that the improvement is of more importance than would appear at first sight.

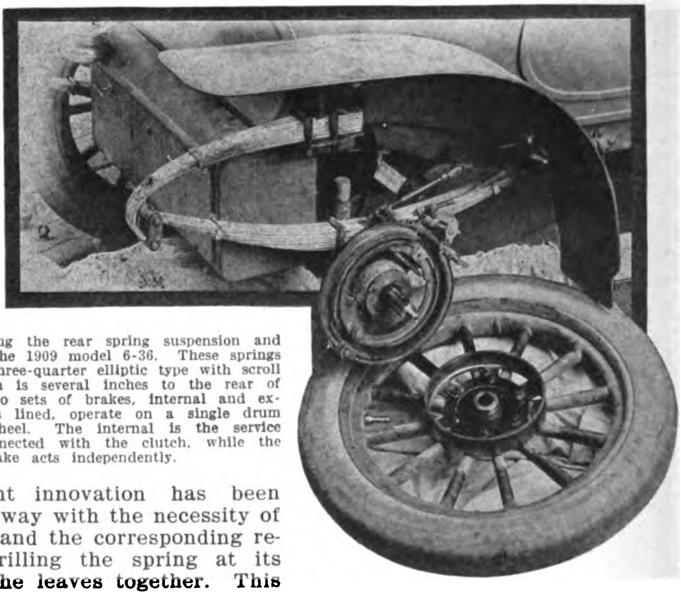

Fig. 8. View showing the rear spring suspension and brake construction of the 1909 model 6-36. These springs as shown are of the three-quarter elliptic type with scroll end. The upper perch is several inches to the rear of that on the axle. Two sets of brakes, internal and external shoes, Raybestos lined, operate on a single drum bolted to the rear wheel. The internal is the service brake and is interconnected with the clutch, while the outer or emergency brake acts independently.

The steering gear is of the nut and screw type, the nut being attached to trunnions carrying die blocks sliding in the jaws of a forked lever which serves to communicate the motion to the steering rod. The cross rod is placed behind the axle to prevent damage to it through meeting an obstruction. These rods are made of nickel steel tubing and are fitted with spring controlled ball joints that automatically compensate for any lost motion occasioned by wear. The throttle and spark control levers are mounted just below the steering wheel and back of it, making easily accessible without removing the hands from the wheel.

Wheel bases of the different models range from 112 inches in the 4-24, which is the shortest, to 135 inches on the 6-60, the intermediate steps being 119 inches for the 6-36, 124 inches for the 4-40, and 130 inches for the 6-48. Goodrich tires form the standard equipment, the sizes employed being as follows: 36 by 4½, and 5½ inches on the 6-60; 36 by 4 and 5-inch on the 6-48, this also applying to the 4-40; 34 by 4 and 4½ on the 6-38, and 34 by 3½ and 4 on the 4-24 when fitted as touring car or roadster; when fitted as a town car with a landaulet or limousine body, the tire equipment is smaller, consisting of 32 by 3½ and 4-inch tires.

The choice of bodies will include practically every type now known to the automobile world. Cast aluminum is the material employed and the Pierce factory supplies the entire demands of its customers where body requirements are concerned from its own shops. As a further instance of the completeness of the Pierce plant and the great extent to which it turns out the various essentials entering into the car, it may be mentioned that it is one of the very few factories that operates its own wheel building shop, the stock for this purpose being purchased long in advance and specially seasoned in the open air before using.

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J. Elmer Pratt, who has been identified with the automobile industry since its inception in this country, has been appointed sales manager of the George N. Pierce Company of Buffalo, makers of the Pierce-Arrow cars.

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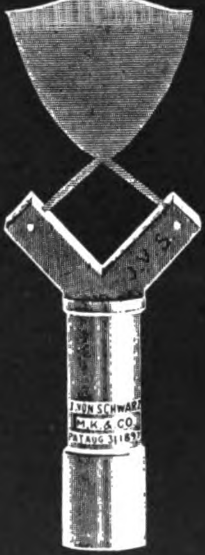

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# The Mora Light Four

The Mora Motor Car Co., Newark, N. Y., are placing on the market for the season of '09 a model known as the Mora Light Four, which is shown in Fig. 1. This car can be had either as a racytype model, having two front seats for passengers and two individual adjustable detachable rear seats, also as a limousine, or as a close coupled tonneau, as shown.

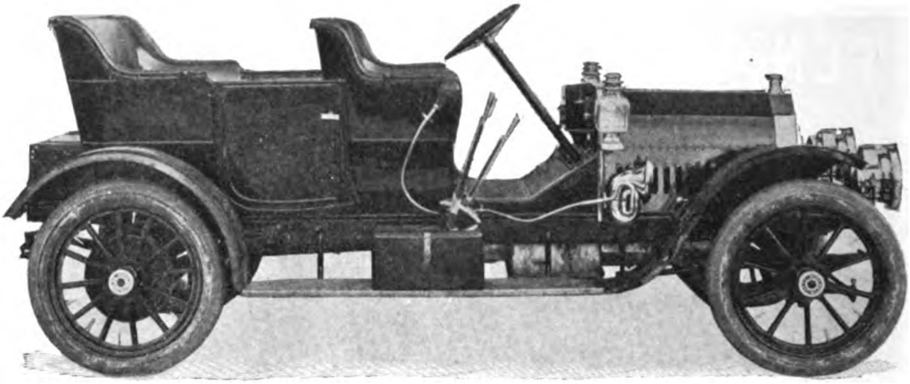

Fig. 1. Mora Mechanically Right Light Four motor, 4-inch bore, 5⅛-inch stroke, integral crank case pan construction, leather faced cone clutch, three speed selective change gear mounted on annular ball bearings. All parts of power plant accessible from above, protected from dirt on the under side, shaft drive, jump spark ignition, dual ignition, using imported magneto and storage battery are supplied on the $2000 model.

The characteristic Mora features, such as aluminum pan crank case construction combined with the change speed mechanism, is retained, being similar in nearly every respect to the power plant construction which was used in last year's model, which captured the world's Sealed Bonnet record. Several refinements have been made, and a thoroughly tested and tried-out annular ball bearing selective transmission is now used. The wheel base is 110 inches and the tread standard.

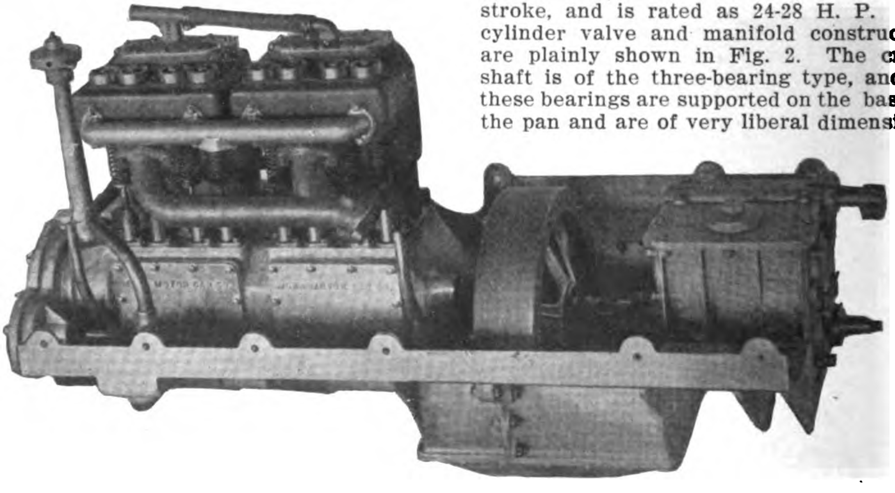

Fig. 2. View of the Mora Light Four unit power plant with integral pan. This construction is practically the same as has been used for the past three years with marked success, and was the construction used in the world's record Seal Bonnet car. Cylinders cast in pairs, valves on one side, four-inch bore, five and one-eighth stroke. Rated as 24-28 H. P.

### POWER PLANT.

The aluminum pan unit construction that proved so satisfactory in the four-cylinder models for the past three years is retained in this car. This is the same power plant that was used in the car of last year which captured the World's Sealed Bonnet Record, but has been refined and coupled with a thoroughly tested and tried-out annular ball bearing selective transmission.

The motor has a 4-in. bore and 5⅛-in. stroke, and is rated as 24-28 H. P. The cylinder valve and manifold construction are plainly shown in Fig. 2. The crank shaft is of the three-bearing type, and all these bearings are supported on the base of the pan and are of very liberal dimensions. The bearing at the rear end of the crank shaft measuring 4 inches in length, middle and front bearing 3⅛ inches. The pistons are unusually long and are bronze bushed for the piston pin, which is held fast in the rod by a tapered bolt.

Lubrication is by splash, the oil being

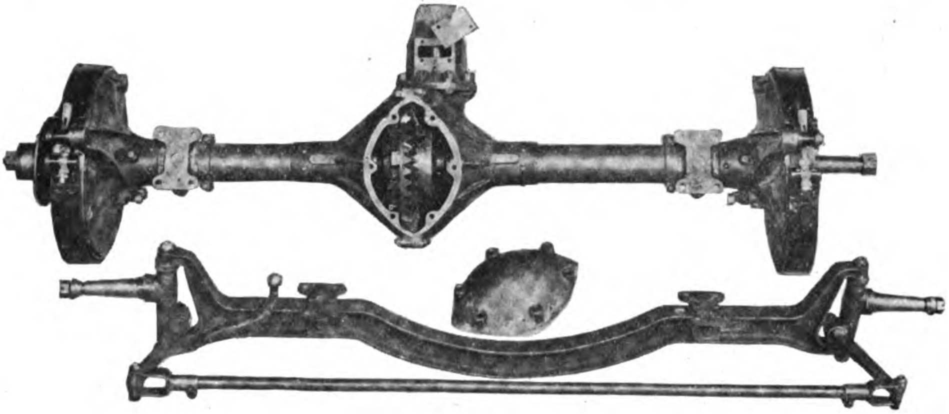

Fig. 3. Views of the Mora Light Four front and rear axle. Differential is of the bevel gear type mounted on special ball bearings. An adjustment is provided for the bevel pinion. Double set of brakes acting on 14-inch diameter drums are provided. Front axle is an I beam drop forging with applied spring perches.

fed by a pressure oiler through two sight feeds on the dash to the compartments of the crank case. A third sight feed is furnished which ordinarily is closed, but may be opened wide to raise the oil line in the crank case should unusually heavy going render this necessary. The cooling water circulation is by gear pump. The clutch is a leather-faced cone of ordinary type.

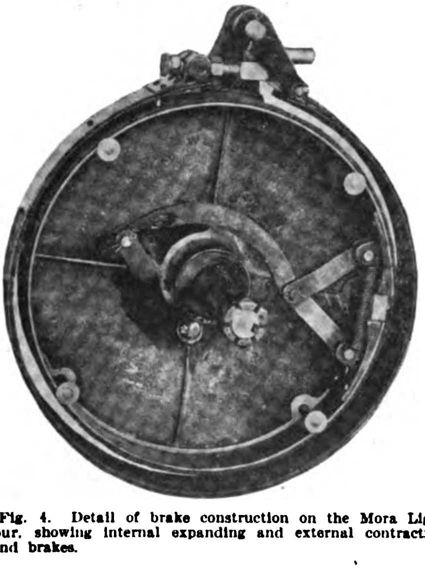

Fig. 4. Detail of brake construction on the Mora Light Four, showing internal expanding and external contracting band brakes.

### CHANGE GEARS.

A three-speed selective change gear is lined up with the motor by fitting in ways machined in the rear end of the aluminum pan power plant support, which pan has always been a feature of the Mora cars. It acts as a support for both motor and transmission, taking the place of a subframe as found in most cars. It serves in keeping motor and transmission in perfect and permanent alignment. It acts as an absolute mud protector. Everything about the power plant can readily be gotten at from a standing position.

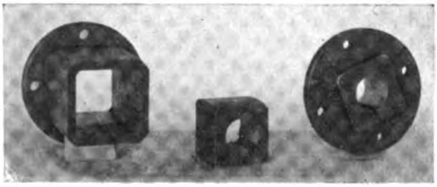

Fig. 5. Details of the Mora Square Block Slip Joint. This block is rounded in a fore and aft direction, but is square in the direction of rotation, and slides in the hollow case shown, thus forming a universal and slip joint.

The transmission of power to the rear axle is through a hardened steel block, square in the direction of rotation and

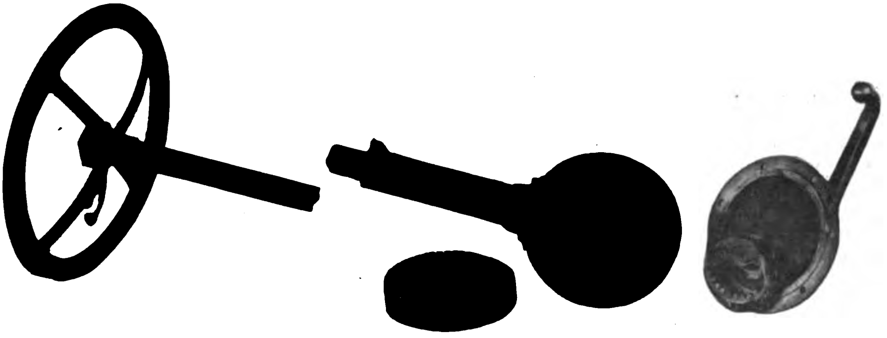

Fig. 6. Details of the Mora Light Four steering gear, which is a combination of bevel gears with an internal gear and pinion.

rounded fore and aft. This slides in a square hole in a hardened steel casing fixed to the change gear shaft.

THE AXLES.

The rear axle has four pitch-driving bevels mounted on special ball bearings. A neat adjustment is provided for the bevel pinion. The brakes are all on the rear axle and act on drums 14 inches in diameter. They are operated through long equalizers sliding in slots in the frame. The front axle is a one-piece drop-forged I-beam, and the wheels are fitted with ball bearings. The front springs are semi-elliptic and the rear are of the ¾ semi-elliptic platform type. The emergency brake is interlocked with the clutch, but the foot brake is not interlocked. Steering is by a combination of bevel gears with an internal gear and pinion. By the use of a drop pressed steel frame practically a direct drive is secured to the rear axle.

A specially designed carburetor is used. It has a single nozzle concentric with the float. The regular air supply passes through holes in the side of the nozzle chamber, and a cylindrical shutter may be operated to close these holes for starting. Auxiliary air is admitted through a spring-retained poppet valve.

Ignition current supply is from storage battery through a four-unit coil, or from a magneto. When the car is sold at $1,850 it is supplied with the battery system only, but when sold at $2,000 the motor is supplied with a double set of spark plugs and the car is equipped with both storage battery and an imported magneto, and the ignition system is then double and strictly independent.

# 1909 Schacht Auto-Runabout

P. S. TICE.

The Schacht Manufacturing Co., Cincinnati, Ohio, are now turning out their 1909 Auto-Runabout. This car is built in but one size wheel base, 74 inches, but may be had with 4 feet 8 inches or 5 feet tread, at the option of the purchaser. The car is of the same high-wheel type that has been built by this Company for several years past and is offered for the coming season at $680 with 40-inch wheels and solid rubber tires; and at $740 when fitted with 36-inch pneumatic tires.

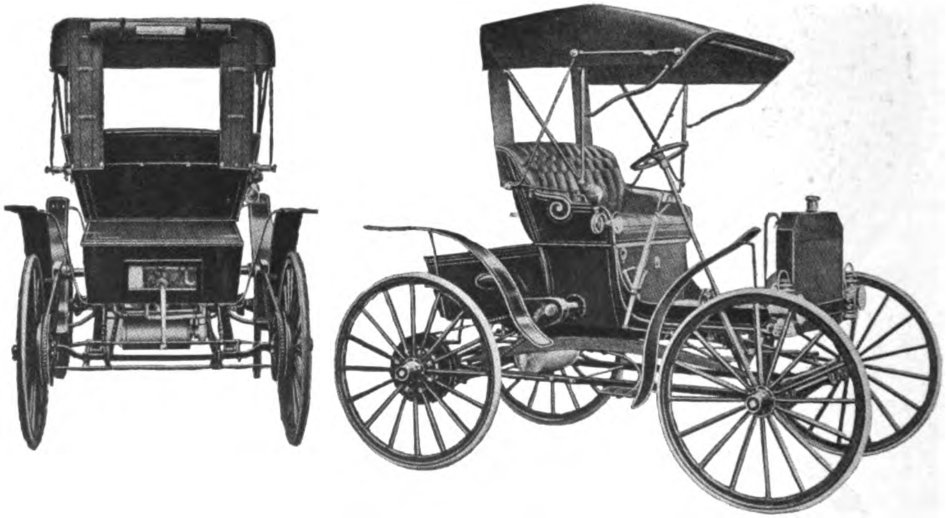

Fig. 1. The Schacht Auto Runabout, Model K, showing the side and rear view. This car is fitted with a two-cylinder opposed 18-24 H P. Davis water-cooled engine, placed crosswise at the rear under a hood which forms the back of the body. Drive is by friction wheel and disc to counter-shaft, thence by side chains. Price, with 40-inch wheels and solid tires, $680, fully equipped, or $740 fitted with 36-inch pneumatic tires.

The running gear, which is worked out in a quite original manner, combining automobile and buggy practice, comprises the front and rear dead axles, each 1¼ inches square forgings, to which the wheels are fitted on Timken roller bearings two long flexible, hickory reach rods maintaining axle parallelism, a pair of side springs equal in length to the wheelbase, and a unique shackling system for the spring ends.

Four brackets are clipped to each axle and supported by them is a rod above the axle and parallel with it the ends of which form the journals of the suspended spring shackles which carry the two longitudinal springs. Adjustable radius rods link the rear axle to the driving jackshaft, as shown later, and, because of the hickory reaches, serve to maintain the relationships of both axles with the body sills, to which are attached the power plant.

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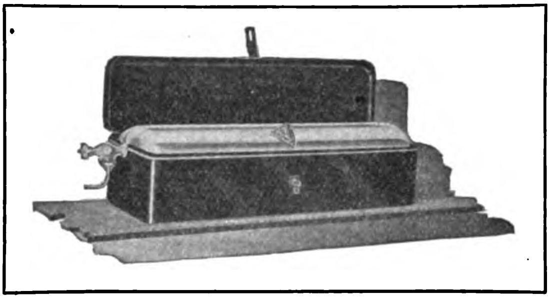

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change speed mechanism, and steering gear. Each rear wheel, which has 16 spokes, has a large combination flanged sprocket gear and brake drum centered upon its hub and clipped to alternate wheel spokes—8 clips in all. To the centers of the long side springs are securely bolted and clipped two heavy hickory sills upon which are built up the power plant, body, etc.

### THE MOTOR

An 18-24 H. P. Davis 2-cylinder opposed engine is bolted to the rearward portion of the sills by the heavy lugs cast integral with the cylinder heads. In this engine, all valves are on top and mechanically operated by a direct driven cam shaft. Mixture is supplied by a Schebler carburetor. Positive lubrication is secured by an individual pump tank oiler belt driven from the crank shaft. A roller contact timer on the rear end of the cam shaft together with a double set of dry cells and dual spark coil comprise the ignition system, the switch being located at the right and just below the driver's seat. A gear driven gear pump circulates the cooling water through the engine jackets and forward to a large vertical, gilled-tube radiator with upper and lower tank compartments. There are 45 tubes in the radiator and the system holds a total of 5 gallons of water, the radiator proper forming the dash. Exhaust gases are piped to a large muffler suspended just beneath the engine and provided with a cut out.

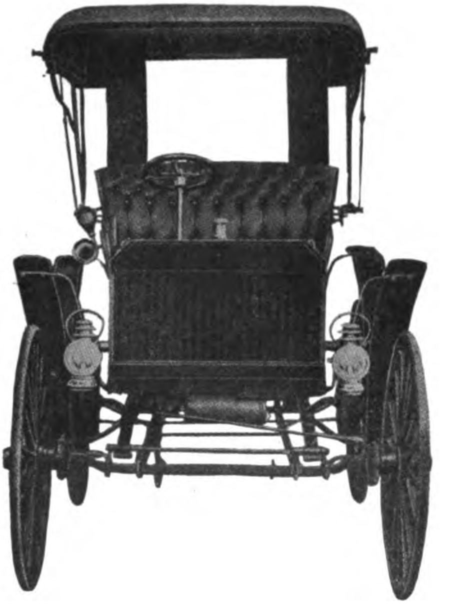

Fig. 2. Front view of the Schacht Auto Runabout. This view shows the radiator which forms the dash and the peculiar mounting of the longitudinal side springs. The ends of these are carried in shackles of the usual form, which shackles are, however, supported on a rod above and parallel to the axles and held to the axles by clips.

### UNIQUE POWER SUSPENSION AND TRANSMISSION

The rearward transverse suspension of the engine is original with this company, and the manner in which power is delivered from the engine to the wheels is unique in the compactness of the assembly. The engine starting crank is permanently attached at the rear of the car and the flywheel is on the forward end of the crankshaft. The construction and relative position of the engine flywheel, and the clutching and speed changing discs and mechanism are clearly shown in Fig. 3 the chassis plan.

The flywheel hub is tapered, keyed and nut retained on the forward end of the crank shaft. Its spokes are provided with bosses located near the rim. The outer surface of the flywheel rim is turned and has centered upon it the hub of the aluminum composition driving friction disc. Bosses on the rear face of the disc register with the bosses on the flywheel spokes and carry studs which freely slide in reamed holes in the spoke bosses as shown in Fig. 4. Helical springs, as shown, maintain the disc against the flywheel rim. Fulcrumed in stud yokes in the rim proper are four levers, bearing against the adjustable disc stud ends, the inner ends of which fit into a grooved collar sidably mounted on the engine end of the flywheel hub. Between this grooved collar and the stationary journal boss for the forward bearing of the crankshaft, are placed a large ball thrust bearing and a lever operated face cam engaging with a similar but reversed cam milled on the journal boss. The moving portion of the cam device connects by levers and linkage with a ratchet retained pedal under the driver's left foot.

Transversely of the car, and just forward of the driving disc as above, is a drum counter and differential shaft carrying the driven friction wheel feathered on four large keys. Within the drum is located a Warner spur differential, one gear of which is attached to a long shaft, extending from one driving sprocket to the other, and the other to a sleeve journaled on the above mentioned shaft. The driving sprockets are connected one to the outer end of the shaft, and one to the outer end of the sleeve. This construction, together with the large diameter of the differential enclosing drawn upon which the sliding driven friction wheel is mounted, provides a very rigid counter shaft the bearings of which are free from wear due to distortion. Four sets of Timken rollers carry this shaft. The paper rimmed driven wheel has a grooved boss in which is fitted a shifting ring operated by a fork connected by linkage to a ratchet retained side lever.

### METHOD OF OPERATION

The operation of the above mechanism is simple and obvious. The driven friction wheel is located as desired by the side lever, which slides it toward or away from the center of the driving disc, and the driver is then advanced to engagement by

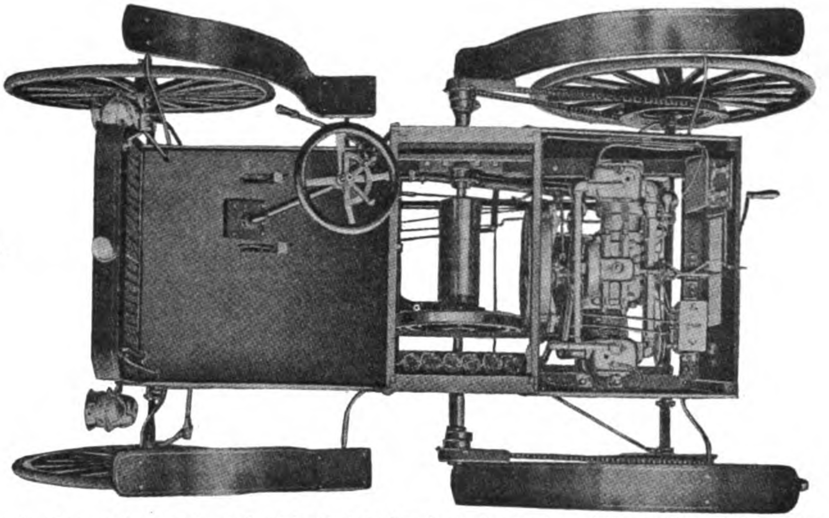

Fig. 3. Plan of the Chassis of the Schacht Auto Runabout, showing the relative positions of the various parts, the engine mounted transversely at the rear, the drum-like counter-shaft which encloses the differential, the steering wheel and control levers, and the radiator dash.

pressure upon the pedal noted above. The clutching or engaging pressure between the two discs, it will be noted, is communicated to the stationary crank case casting through the face cam, and thus no end thrust is imposed upon the crank shaft bearings.

### CONTROL

The driving sprockets, on the ends of the counter shaft and counter shaft sleeve, respectively are housed in metal guards to which the forward ends of the rear fenders are bolted. Both the housings and the sprockets themselves are readily removable, thus permitting of a quick change in gearing ratio by the substitution of larger or smaller drivers as desired. When the side lever is at the limit of its forward motion, the driven wheel and countershaft run at the speed of the engine and the only reduction is then due to the sprocket. The standard sprocket ratio is a trifle over 6 to 1, which gives a speed of 30 miles per hour at the engine's rated speed. Eight gallons of gasoline are carried under the seat in a galvanized, riveted tank.

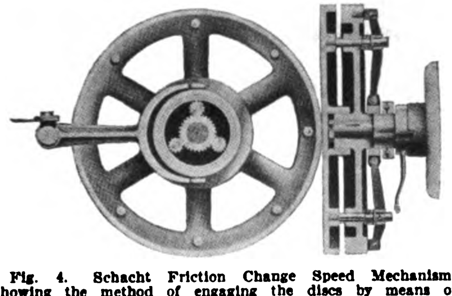

Fig. 4. Schacht Friction Change Speed Mechanism, showing the method of engaging the discs by means of face cams acting against the end of the crank case and moving the levers, which by means of compressed springs under plungers force the plate against the wheel. The differential in the cylindrical drum countershaft is also shown. The engaging of the discs causes no end thrust upon the engine shaft.

A second ratchet retained pedal, operated by the right foot, controlls the expanding shoe hub brakes, within the rear sprocket driver of 10 inches diameter and 2 inches face. These brake shoes are faced with camel's hair belting and spread against spring action by cams attached to the ends of a rod extending across just beneath the rear axle. Brake adjustment for wear is secured by a device which alters the relative position of the operating lever, connected by links to the pedal, with reference to the brake shaft bearing the cams. This adjustment is readily made and does not alter the length of the brake link. Throttle and spark control levers operate over a stationary quadrant above the steering wheel, which is mounted at the top of an inclined column and operates a Ross irreversible steering gear.

### BODIES

The bodies are of the Corning type and the large comfortable seats are of the style known as the King of the Belgians. High grade buffed leather over curled hair is used for trimming, and the standard color is red, for the body and seat with a carmine gear. Special colors are extra. One and three-eighth inch flat tires are standard equipment. The price of the car includes a top with front and side curtains of rain proof material, a pair of oil side lamps and a full outfit of tools. The road clearance with solid tires is seventeen inches and the weight of the complete car with tanks filled is approximately one thousand pounds.

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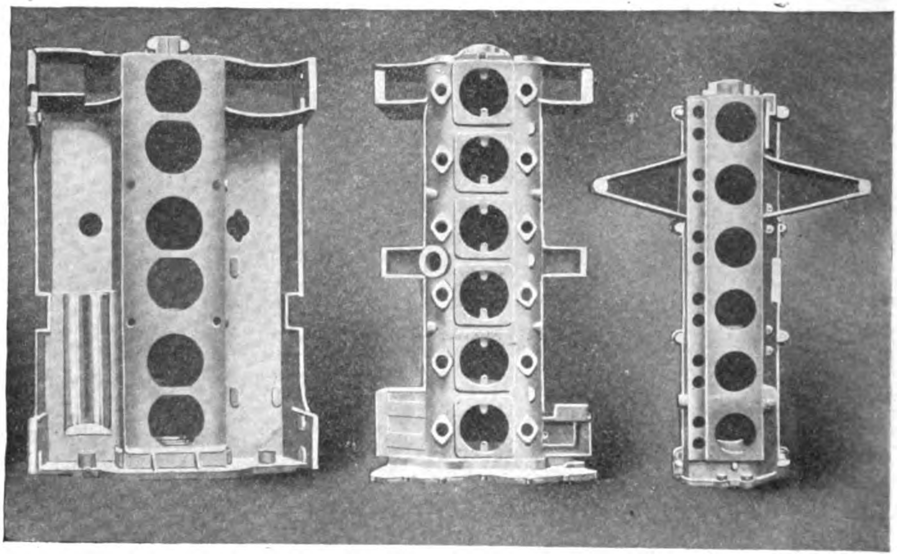
Buick Motor Co., Flint, Mich., have called our attention to an error in a notice which appeared in our December issue regarding a new price on the Buick Model 10, 4-passenger car. The correct price is $1,050.



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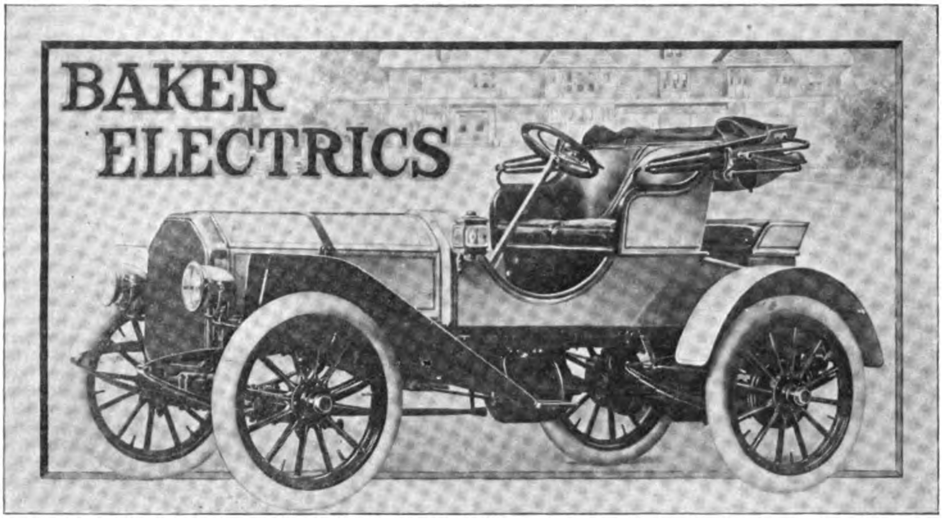


BY P. S. TICE.

Several new models and types have been added to the line of electric cars manufactured by the Baker Electric Vehicle Co., Cleveland, Ohio. Briefly specified, this line of cars now includes a Queen Victoria of 71 inches wheel base with pressed steel frame mounted on semi-elliptic front and full elliptic rear springs and fitted with 32 by 3½-inch pneumatic tires, front and rear, which sells for $1850. The chassis upon which this Victoria body is mounted is powered by a battery of 24 cells, 9 MV, and a General Electric series wound motor of 2 rated horse power which is capable of carrying a 300 per cent. overload. Steering is by side post and horizontal lever; and speed controls, six forward and three reverse, with a maximum of 20 miles per hour, are had through a vertically placed lever at the side of the seat. Motor speed is reduced to a countershaft by a Reynold silent chain and the final drive to the rear axle differential is by single roller chain. This chassis, designated as P 1, is also fitted with a straight front coupe body with inside control, and when so fitted sells for $2250. These two bodies, the Victoria and coupe, are interchangeable and make possible the possession of a summer and winter car with a single chassis. The P 1 chassis is sold separately for $2000, the Victoria body for $300, and the straight front coupe body for $800. A photo herewith, Fig. 1, shows this chassis fitted with the Victoria body.

A chassis similar to the P 1 with the exception of the provision of a larger battery, 28 cells, 9 MV, and a 2½ H .P. motor with 300 per cent. overload capacity, is fitted with an extension front coupe body, also shown in an accompanying photo. This body provides considerably more room inside than is had with the straight front coupe and has an additional seat so that four passengers can be comfortably accommodated. The extension front coupe, inside controlled, with capacity for four passengers and mounted on the larger capacity P 2 chassis, is sold for $2500. In all Baker chasses there are several features that are the same—such as brakes and brake control, speed controller, drive chain adjustment, etc.—and these will be taken up in detail after the various types of body have been described.

The I chassis, which sells for $2500 when fitted with either a four-seat brougham or landaulet body, is considerably different from the P 1 and P 2 chassis in that it is much heavier, larger and higher powered. This chassis is of 89 inches wheel base and 56 inches tread, mounted upon semi-elliptic springs front and rear and wheels of the artillery type fitted with 34 by 4-inch front and 34 by 4½-inch rear pneumatic tires. The frame is of pressed steel. Steering is by a large wheel mounted on an inclined post which also carries the speed controller lever. In this chassis, the motor is of six rated horse power and is supplied by a 40 cell, 11 MV battery. The motor, which is also of 300 per cent. overload capacity, is carried in front and drives a long doubly jointed propeller shaft through a Reynold silent chain reduction. The bevel driving gears and differential are inclosed in a casing in the rear live axle structure and drive the wheels through semi-floating shafts. Each rear wheel carries two brakes, an external band operated by a foot lever, ratchet retained, and a second internal expanding set operated by a side lever. The driver's seat is almost over the front wheels, leaving room for a large comfortable body enclosure. If an average speed of 12 miles per hour is maintained, the battery capacity is guaranteed to give a mileage of 50 on a single charge, while 40 miles is guaranteed with a speed of 16 miles per hour. The maximum speed of the car is 20 miles per hour.

Another type of chassis is made, retaining the forward placed motor and propeller shaft to bevel rear axle, 92½-inch wheel base with standard tread, mounted on semi-elliptic springs, front and rear, and fitted with 36 by 3½-inch front and 36 by 4½-inch rear pneumatic tires, 2½ H. P. motor and 28 cell, 9 MV battery, with side steering post and lever, and is fitted with either a coupe or depot carriage body, each having an unenclosed driver's seat. With coupe body this chassis is sold for $2,200, and with depot car body for $3,000.

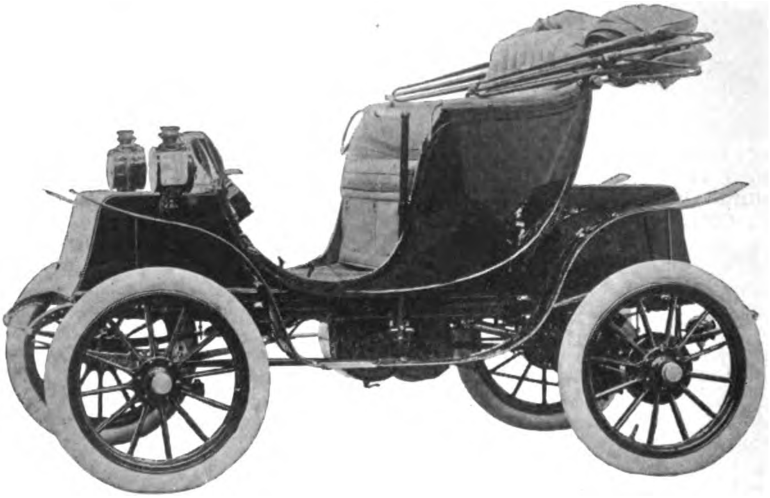


Fig. 1. Queen Victoria Baker Electric. Side lever steering and speed control, finished in black with green or blue panels and running gear, with trimmings to match, top either full V or open. Price $1850. General Electric motor, battery 24 cells. 9 M. V.

A second chassis, which is in every way similar to the one just described, with the exception of the wheel base, which is 86½ inches, may be had with Victoria body and rear, elevated driver's seat for $2000, or with surrey body for $2200.

The Baker Suburban, which seats two, is mounted on a chassis similar to the Victoria or surrey, except that the battery is of 28 cells, 11 MV, to secure a greater mileage per charge.

The smallest chassis built by the Baker Co. has 68-inch wheel base, full elliptic springs throughout, 30 by 3½-inch tires front and rear, side steering post, 1¼ H. P. motor and 14 cells, 9 MV battery. The controller gives three forward speeds and the same number in a reverse direction. Drive is by single roller chain, and a capacity of 40 miles per charge is guaranteed. This chassis with Stanhope body is sold for $1000, and with a small straight line Imperial body for $850.

Black with panels of blue, green or maroon are the standard colors for all the foregoing cars, the trimming being in broadcloth to match the panels. Materials and workmanship employed in painting and trimming of Baker cars are of the best obtainable.

### A DISTINCT DEPARTURE.

The two latest Baker models, M and S, are a distinct departure from accepted electric car designs, at least in so far as the appearance is concerned. Recognizing the growing demand for cars of smart and snappy appearance, the Baker Co. has produced these two models, which resemble the popular high powered gasoline roadster and light runabout, respectively.

The M has the long, low racy look of a six-cylinder roadster and is fitted with a rumble seat roadster body, as shown in the title cut. With full equipment, electric headlights, side lights and tail lamp, top and shock absorbers, this car is sold for $2,500.

The frame is of armored wood mounted on semi-elliptic springs, front and rear. The wheel base is 95 inches with standard 56-inch tread. Tires are 34 by 4 inches front and rear. A series wound motor rated at 3½ H. P., with overload capacity of 300 per cent., is supplied by a 40 cell, 9 PV battery. The speed controller, with operating lever under the steering wheel, gives nine speeds forward and three reverse, with a maximum speed of 30 miles per hour. Seventy miles per charge is guaranteed at an average speed of 15 miles per hour.

In this car, the motor is hung under the floor boards and drives the rear axle bevels through a short propeller shaft on which is mounted a drum for one of the two brakes, the other brake being internal expanding in the rear wheel hubs. In this car, as well as in all Baker cars, the motor armature shaft, the counter shaft, rear axle shafts, and wheels are mounted on imported annular ball bearings. The standard M roadster is delivered with blue body and yellow gear, the trimming being in best grade of leather.

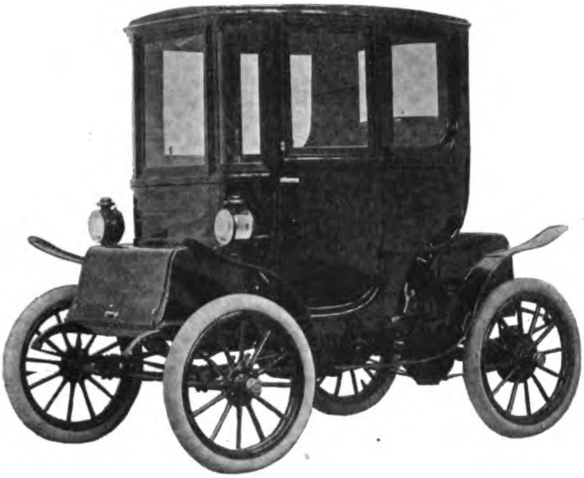


Fig. 2. Baker Extension Front Coupe. Inside control by side levers. Finished in black with blue, green or maroon panels. Trimmed in broadcloth to match panel coloring. Price $2500.

### MECHANICAL DETAILS.

All detail discussion of the distinctive Baker features has been avoided in the foregoing. In the following matter, however, will be found a description of most of these features; and, while they are here taken up in connection with the S runabout, they are the same in all chain-driven Baker cars with the exception of the chassis of the Stanhope and Imperial.

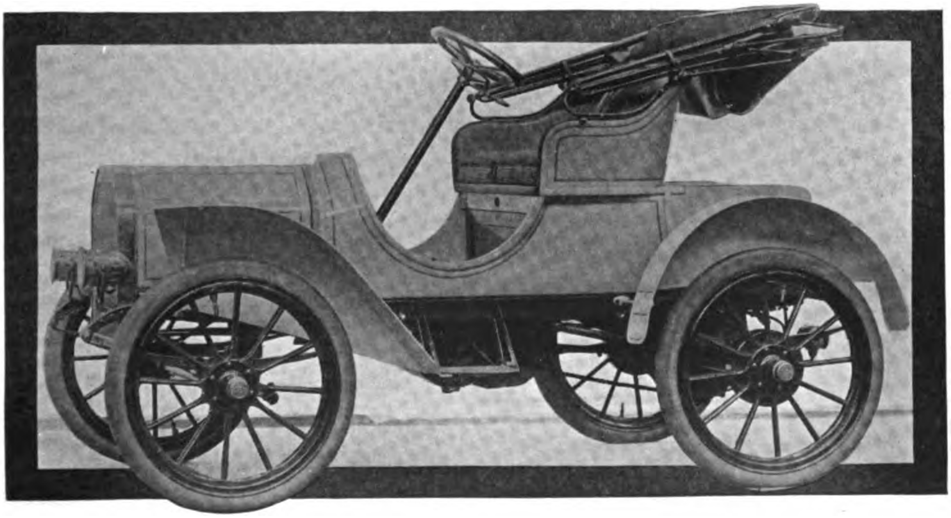


Fig. 3. Baker Electric Model S. Runabout. Wheel steering speed control by lever under wheel. Open type top. Electric headlights, side lights and tail lamp. This model and the model M shown in the title cut are departures in electric vehicle designs, resembling as they do the popular high powered, gasoline roadsters. Tires 34 x 4 inches. Armored wood frame; 3½ H. P. motor. Overload capacity 300 per cent. 40 cell, 9 P. V. battery. Nine speeds forward. Maximum 30 miles per hour, 70 miles per charge, guaranteed at an average of 15 miles per hour. Price $1850.

### S. RUNABOUT DETAILS.

The photo of the S runabout, Fig. 3, gives a very clear idea of the snappy, clean-cut general appearance of this car, which promises to be a prominent Baker leader. It is here shown fully equipped, as delivered to the purchaser at a cost of $1850, f. o. b. Cleveland.

The frame is of pressed steel channels with five cross members. Between the two end members and those adjacent to them are placed the slat floors which support the two battery units. This method of carrying the battery, in two sections, one at either end of the car, gives an almost perfect distribution of weight to the axles and wheels and very materially adds to the stability of the car and renders it almost immune from skidding.

The wheel base is 71 inches with 56-inch tread. Wheels are of the artillery type and fitted with 32 by 3½-inch pneumatic tires. Semi-elliptic front and full elliptic rear springs are employed. The front springs are attached to the frame in the usual manner, and seat upon spring perches brazed to the axle tube, as are the Elliot type steering knuckles. The tie rod for the steering arms of the wheel pivots is located at the rear of the axle, and the steering link from the gear arms diagonally forward to a second lever arm integral with the right hand wheel spindle. All joints in both the steering link and the tie rod ends are ball and socket provided with ready means for taking up wear. The front wheels are each carried on two races of annular balls.

Between the third and fourth cross frame members are two longitudinally placed members which form a sort of sub-frame to which the motor is suspended. This suspension is flexible and provides a peculiar advantage, as will be shown later. The motor is a General Electric rated at 2½ H. P. and capable of a 300 per cent. overload. As shown in the view from beneath the chassis, Fig. 4, a countershaft driven by enclosed Reynold silent chain gives the first reduction between the motor armature shaft and the wheels. This countershaft is mounted in two imported annular ball bearings, as is also the armature shaft itself, and all these bearings, as well as the Reynold chain, are completely enclosed and protected.

Upon one end of the countershaft is secured a sprocket pinion over which runs a high-grade roller chain which drives the sprocket gear attached to the differential within a housing formed in the rear axle center. The rear axle is of the conventional semi-floating type with shafts mounted in annular ball bearings, and is maintained in proper relationship with the frame and front axle by long non-adjustable radius rods. These rods are made right as to length, once for all, at the factory, and thereafter it is never necessary for the user to change them for the purpose of taking up chain slack, with the ever present possibility that when the slack has been taken up the axles will be out of parallel, which induces rapid tire wear. The motor suspension and a third radius rod are made to take up all chain wear without disturbing the relationship of the axles and frame.

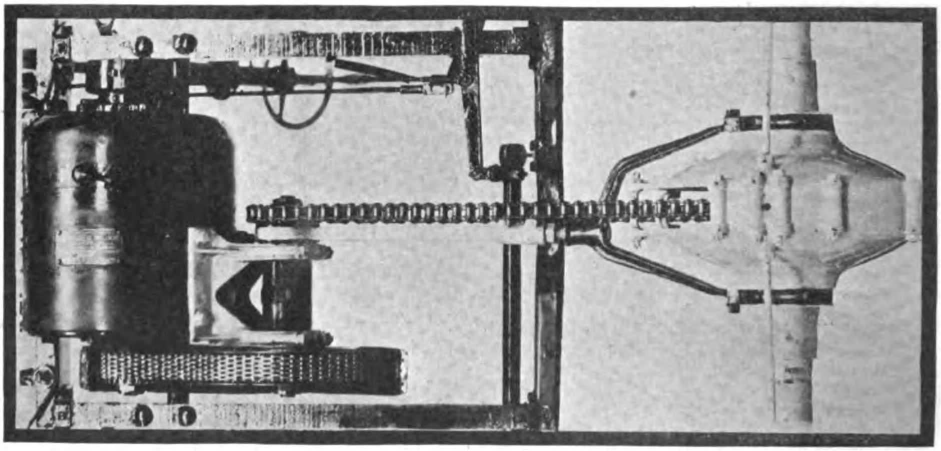


Fig. 4. Under side of Baker Electric power plant, showing motor. Reynold silent chain speed reduction (lower half of case removed). Single roller chain transmits power to rear axle, sprocket and differential being enclosed. Radius rod for general adjustment without moving rear axle, as described in text.

### CHAIN ADJUSTMENT.

In the plan view of the chassis, Fig. 5, it will be noted that the motor is suspended from the sub-frame members by a tube attached to them at its ends. This tube is clamped to the motor casing but is free to rotate in the boxes provided for its ends. In the under view of the chassis is seen the driving chain and a central radius rod with a yoked rear end. The forward end of the radius rod is bored out to embrace the casing of the countershaft and the two ends of the rear forged yoke are bored out to embrace turned surfaces on each side of the differential housing and split after the manner of the eccentric straps of a steam engine. Just forward of the yoke is a heavy right and left threaded bolt with a hex at its center. When the chain has become slacker than it should be, through wear, the split clamp shown integral with the forward part of this radius rod is loosened and the oppositely threaded bolt turned till the chain is sufficiently tight, when the clamp is again locked. In making this adjustment, it is apparent that the axle has not been moved, but, instead, the motor as a whole has been pushed slightly forward about the suspension bar as a pivot.

### CONTROL.

The steering gear, which is shown in place in the car, as well as in detail, in Fig. 6, with the cover plate removed, is of the internal gear and pinion type and is operated through an enclosed and inclined shaft carrying a large hand wheel at its upper end. The internal gear is carried on a spindle which has a long bronze bushed bearing at each end. The pinion is integral with the lower end of the steering shaft and is carried in an eccentric bushing, by means of which wear and backlash are readily taken up. Enclosing the steering shaft or post is a polished brass sleeve having secured to its upper end the speed controlling lever and to its lower end a bronze mitre gear. This latter meshes with a second gear on the spindle of a drum controller located under the inclined toe boards of the car. The lever at the upper end of the sleeve works over a plain ring provided with a deep notch at the neutral point to obviate the

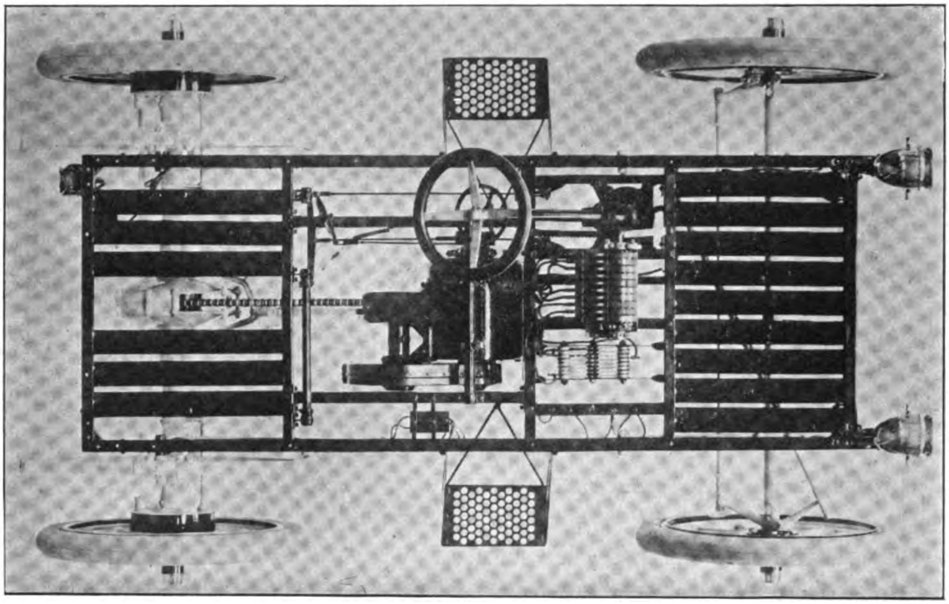


Fig. 5. Plan of S Runabout chassis, showing the two battery platforms, front and rear, and general arrangement of parts with body in position. The controller lies under the inclined toe boards and the motor under the main floor, leaving the space under the seat free for luggage.

possibility of an inadvertent engagement of the reverse contacts when shutting off power while running ahead, or vice versa. The drum controller is extremely well built and insulated and the progressive contacts are so made in its operation that no jerking of the car or sparking at the contacts is possible. From the time of making of the first or lowest speed contact, to start the car, no cessation in the driving torque is had as successively higher speed contacts are made. The first two of the six forward speeds utilize the resistance coil or box, shown at the right of the controller in the chassis plan, but the last four, giving speeds of 13, 16, 18 and 22 miles per hour respectively, are made without resistance. The battery cells are at all times in series. While the neutral point is located by the shift lever pawl falling into a notch, as above, there is on the end of the controller spindle, opposite the shifting gear, a segment with notched periphery and a roller-ended, spring-retained, lever which drops into these notches and serves as an indicator and retainer of the controller position.

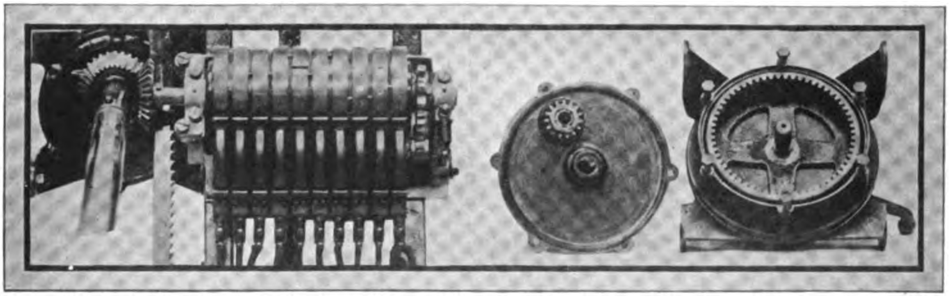
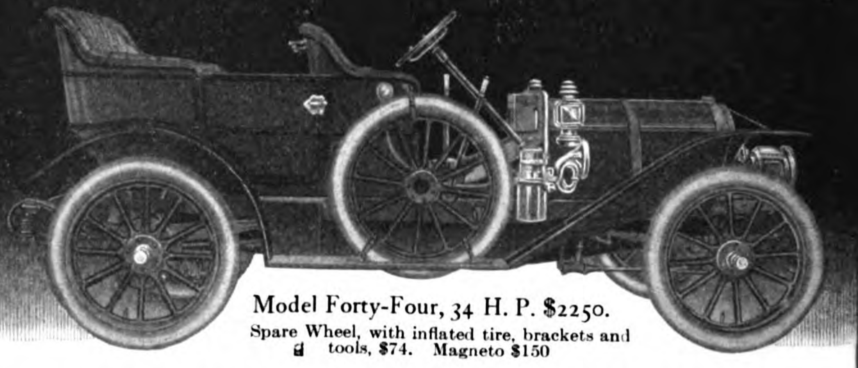


Fig. 6. Showing at the right, details of the Baker electric steering gear, which is of the pinion and internal gear type, fully described in the text. At the left is illustrated the speed controller, which is operated by a lever under the steering wheel.

### BRAKES.

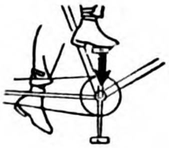
Two foot-operated brakes are fitted. The pedal under the right foot operates thru a lever and return linkage (chassis plan) a contracting band on the end of the motor armature shaft. This brake is very powerful because of the high speed of this shaft relative to the speed of the wheels. The pedal operating this motor brake is spring returned to the off position when foot pressure is withdrawn. The second set of brakes are internal expanding shoes within the rear wheel hub drums. These are balanced in the usual way by a whiffle-tree device, and the pedal operating them automatically locks itself when pushed forward. To release or keep the ratchet from acting during momentary stops, a slight pressure toward the right is applied against the pedal as it is pushed forward.



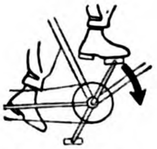
Model Forty-Four, 34 H. P. $2250.
Spare Wheel, with inflated tire, brackets and tools, $74. Magneto $150

# THE OFFSET CRANK SHAFT

Most automobiles develop sufficient power when they are traveling at a *high* speed. The greatest need is for power at *slow* engine speeds. Rambler Model Forty-Four can be operated smoothly and steadily at *three* miles an hour on *high* gear. This is because of the offset crank shaft.



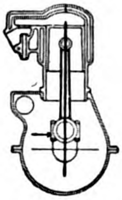
**Corresponds to position of piston in ordinary engine at explosion center.**



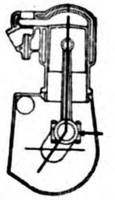
**Corresponds to position of piston in Rambler engine at explosion center.**

## Rambler

**The Car with the Offset Crank Shaft**



**Ordinary Engine. Position of piston at explosion center.** Explosion exerts no turning effort to crank shaft. The dead center wastes energy. Shock falls on bearings.



**Rambler Offset Crank Shaft. Position of piston at explosion center.** Full power of explosion exerts turning effort to crank shaft. Dead center eliminated. No energy wasted. No shock to bearings.

Seven passenger model, forty-five horse power with offset crank shaft, $2500. Other models, $1150 to $2500. Write for catalog describing Rambler offset crank shaft, Spare Wheel, straight line drive and other features of the new Rambler.

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# The Corbin 1909 Cars

HUGH DOLNAR.

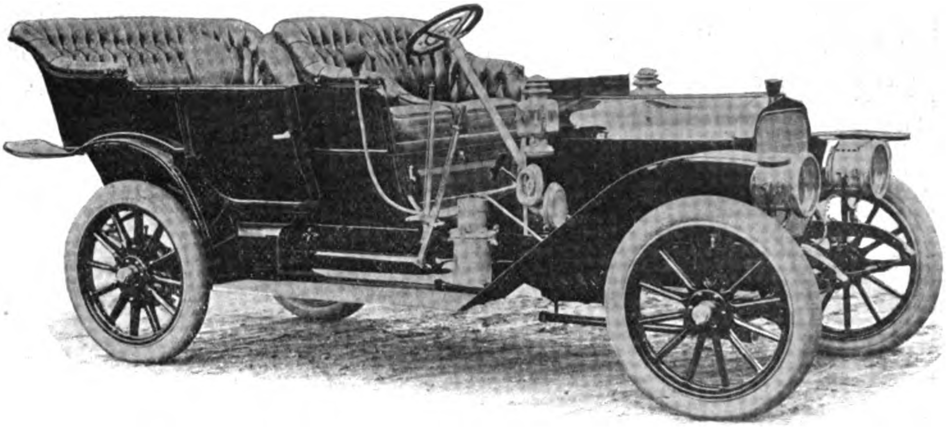

Fig. 1. Corbin 7-passenger touring car. Wheel base 114 ins., 56 ins. gauge, tires all 34 x 4 ins. Motor, 4 cylinders, 4½ x 4¼ ins., 4-cycle, water-cooled, 30 H. P. at 1200 R. P. M., selective sliding gear, 3 forward speeds and a reverse, with bevel gear to the divided semi-floating rear axles, squared at both outer and inner ends. Weight, 2700 lbs. Price, $2,750.00, including 5 lamps, generator, mats, horn and tools, ready for extended touring. Cape top extra.

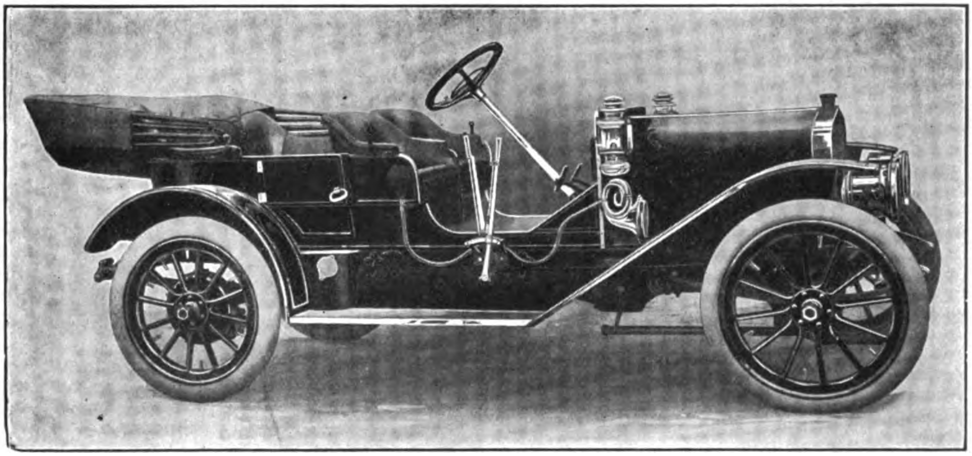

Fig. 2. Corbin 1909 Baby Tonneau, to seat four, can carry five passengers, wheel base 108 ins., gauge 56 ins., 34 x 3½ in. tires front, 34 x 4 in. tires rear. Motor 30 H. P. sliding gear and bevel gear to divided rear axles, all same as Fig. 2. Weight about 2300 lbs. Price $2,650.00, with 5 lamps, mats, horn and tools, all ready for the road. With touring car body, weight 2,350 lbs., $2,500.00. Cape top as ordered.

The Corbin Motor Vehicle Corporation, New Britain, Conn., U. S. A., will offer for the season of 1909 a 7-passenger touring car, a limousine, a town car and a landaulet on a chassis of 114 ins. wheel base, 34 x 4 inch tires all round except 34 x 4½ ins. for the landaulet rear wheels, and will place on a 108-inch wheel base chassis a 5-passenger touring body, a 4-passenger runabout and a "baby tonneau" body to seat four or five passengers. All of these seven Corbin 1909 models will be driven by the same 30 H. P. motor, four cylinders, 4½ x 4¼ ins., 4-cycle, water-cooled, will have the same selective 3 forward speeds and a reverse sliding gear speed change, and the same bevel gear rear axle. The motor, the sliding gear and the front and rear axles are all built by the Corbin Corporation at the New Britain factory, of the best materials. Special care has been given to the motor design, which embodies many unusual features of obvious advantage.

### NOTABLE FEATURES

The Corbin cars were first put out with air-cooled, 4-cylinder motors, 3¾ x 4¼, about 70 lbs. compression, rated as 16-20 H. P.; afterwards enlargements were gradually made up to 4½ x 4¼, air-cooled, rated at 30 H. P., these last air-cooled, 30 H. P. motors being yet offered by the Corbin Company. These motors cool perfectly and many purchasers could not now be induced to drive a water-cooled, motor-driven car. The Corbin engineers firmly believe in the superiority of air-cooled motors and are therefore yet offering them to prospective purchasers, although, in deference to the apparently strong popular prejudice against air-cooling, the present water-cooled, four-cylinder motor, cylinders 4½ x 4¼ ins. was placed on the road in 1907, and is offered as the regular Corbin car motor for 1909.

It is true that some forms of air-cooled car motors could use only a low compression, and even with the low compression did not cool well, and were unreliable, and it was because of these imperfectly air-cooled motors that a prejudice was established against air-cooling in general, although there have been perfectly satisfactory air-cooled motor-driven cars offered by successful manufacturers for several years past, and the general disapproval of air-cooling is, in fact, based on ignorance of what has been done. But as the prejudice does exist, the Corbin management found it expedient to put out the water-cooled motor here shown, which has many notable features.

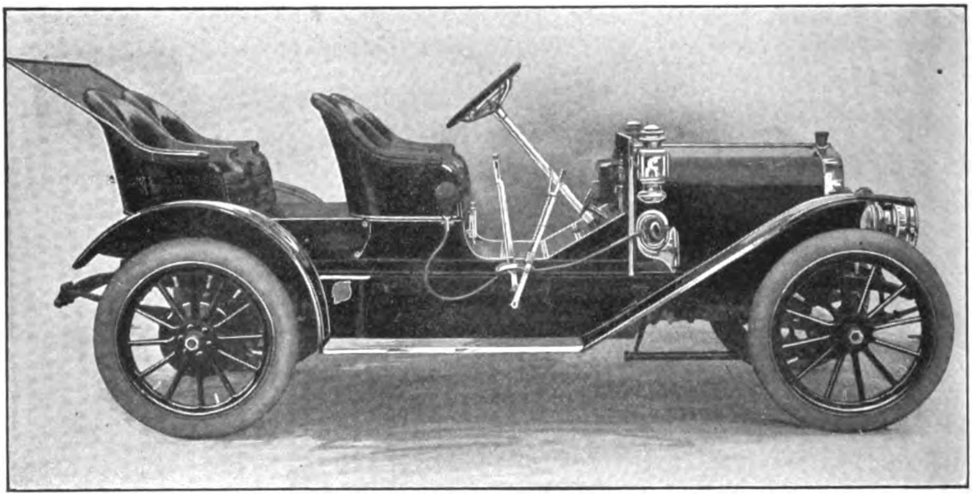

Fig. 3. Corbin 1909 Runabout, to seat four passengers. 108 ins. wheel base, 34 x 3½ front tires, 34 x 4 rear tires, 30 H. P. motor, sliding gear and bevel gear to divided rear axles, all same as Fig. 1. Weight about 2,250 lbs. Price $2,500.00, including 5 lamps, mats, horn and tools, all ready for the road.

The two rear "bucket" seats are individual, and one can be removed and the remaining seat placed in the middle, or a single rumble seat may take the place of the two rear bucket seats. Cape top as ordered, extra.

The Corbin motor has individual cylinders standing on an aluminum base, to one side of which the aluminum cam-shaft support and housing is applied. The crank-shaft journals are not carried by the motor base, as is the almost universal practice, but are 5 journal boxes in the aluminum oil basin; the front and rear journals of the crank-shaft being in annular ball bearings with three plain bearing, Parson's white bronze, between the two annular bearings. The bolts which hold the cylinders to the motor base are long enough to go entirely through the oil basin, heads underneath and nuts on top of the cylinder lugs, so as to place the aluminum oil basin and motor base in compression. The cams have horizontal lever riders on top, no cam rollers, the riders transferring the cam action to short lifters containing spring plungers which impinge the valve-stem lower ends, so as to ensure continuous contact, the plunger springs being so light as not to interfere at all with valve seating.

The clutch has 3 light coiled engagement springs which act from a front crank-shaft flange and ball thrust bearing to push the clutch cone forward. The clutch is disengaged by a rocker with two arms carrying ball bearings which impinge a plain flange integral with the 3-coiled spring spider.

The change gear is all hard, all 7 d. p., and is all ⅞ in. face, is selective, 3 forward speeds and a reverse.

The chassis frame is pressed steel, sides parallel, raised at the rear ends over the rear axle in the 114-inch wheel base model and straight on top in the 108-inch wheel base model. The springs are half elliptics in all the Corbin 1908 models, with "triple action" in the rear for the 114-inch wheel base only.

### THE CORBIN 1909 WATER-COOLED MOTOR

This carefully designed motor was placed on the road in 1907, was the regular motor for 1908, and will be continued through 1909 with no changes of importance. The cylinders are 4½ x 4¼, and show better than 30 H. P. at 1200 R. P. M.

The individual gray iron cylinders are on an aluminum motor base surmounting an aluminum oil basin with two dual oil pits, all in usual manner, but the crank-shaft bearings are not in the upper half of the case, but are in the oil basin, the upper half merely supplying caps for the

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annular F. and S. ball bearings which carry the crank-shaft end journals. The oil basin is semi-cylindrical with cross members inside for carrying the three intermediate crank-shaft bearings in plain Parson's bronze bearings having individual caps. The oil basin and motor base are held to the cylinder lugs by long through bolts, heads under the oil basin, nuts on top of the individual cylinder lugs.

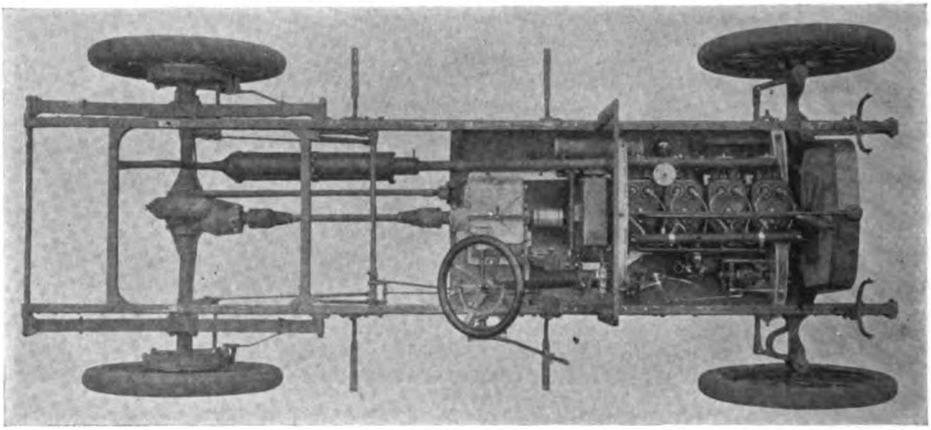

Fig. 4. Corbin Chassis plan. The general arrangement of parts is the same for both lengths of wheel base. The frame is pressed steel, 5-32 side frame thickness and ⅛ cross member thickness, greatest side frame depth 3½ ins. for the 108 ins. wheel base, and 4½ ins. for the 114-inch wheel base.

The motor front end is suspended from an aluminum arched cross-member, while the rear end is bolted to the front end of the gear box in unit assembly, protecting the under side of the fly-wheel, clutch and universal joint assembly to the gear box line shaft. The aluminum gear box is, in turn, supported on one, channel-section, pressed-steel cross-girt

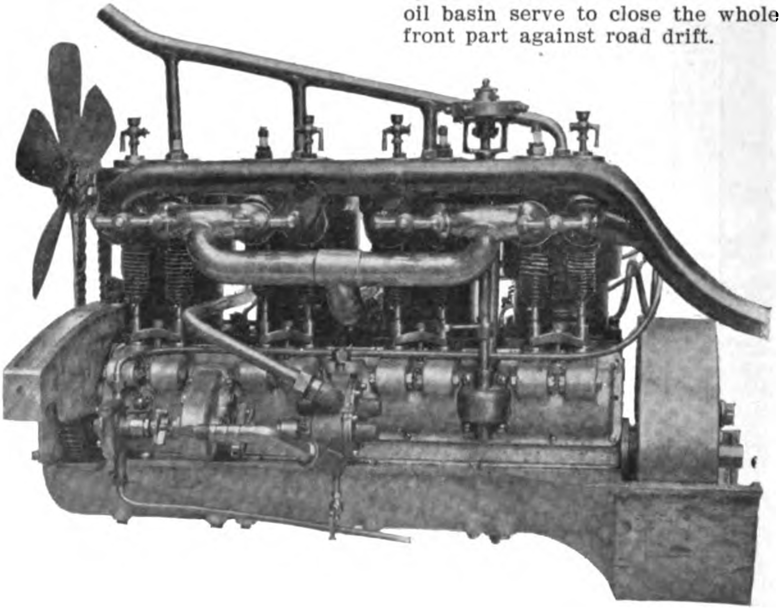

Fig. 5. Corbin Motor, left side. The 2-pinion oil force pump at the left front of the cam-shaft housing and the two pinion water circulating pump at the middle, are driven by ball drivers from a spur gear train from the cam-shaft, all as clearly shown in this picture, giving the pumps a free drive.

The exhaust pipe, steel, 1¾ ins. inside diameter, has its bends and delivery pipe all electrically welded into an integral structure, the cross pipes giving expansion mobility.

The rear end of the oil basin spreads to shield the lower half of the fly-wheel, and the gear box is spread at its forward end to bolt on the oil basin fly-wheel shield. The front end of the motor is suspended from an aluminum arched frame cross member, and the motor assembly rear end support is given by the gear box in unit assembly with the oil basin, resting on the second frame cross girt. Steel plates fixed to the chassis side frames and the motor oil basin serve to close the whole chassis front part against road drift.

### THE VALVE ACTION

The valve lifters are in bronze guides, each pair held by one screw through the middle of a double fork strap. The ports are all 1 9-16 dia. The valves are nickel steel, heads and stems integral, with constant contact spring plungers below the valve stem low ends (see Fig. 7). The coiled valve springs are coned at their lower ends and deliver their down-thrust to the valve stems through split-pins in the stems, no collars. It will be noted that the cam motion transmission parts and the valves and springs are all as light as possible, no cam-rollers and no spring collars, and the cross-motion is taken by the hardened cam-lever or rider, making a free lifter motion, while the spring plungers ensure constant contact, silence and small wear. Unquestionably, the valve action should have parts of as little weight as can be made to serve, to avoid hammer and anvil effect between the cam and valve face. It will be noted, Figs. 6 and 7, that the entire cam shaft action forms an individual unit assembly, which can be separately assembled and then applied to the side of the motor base, which is an important constructional advantage.

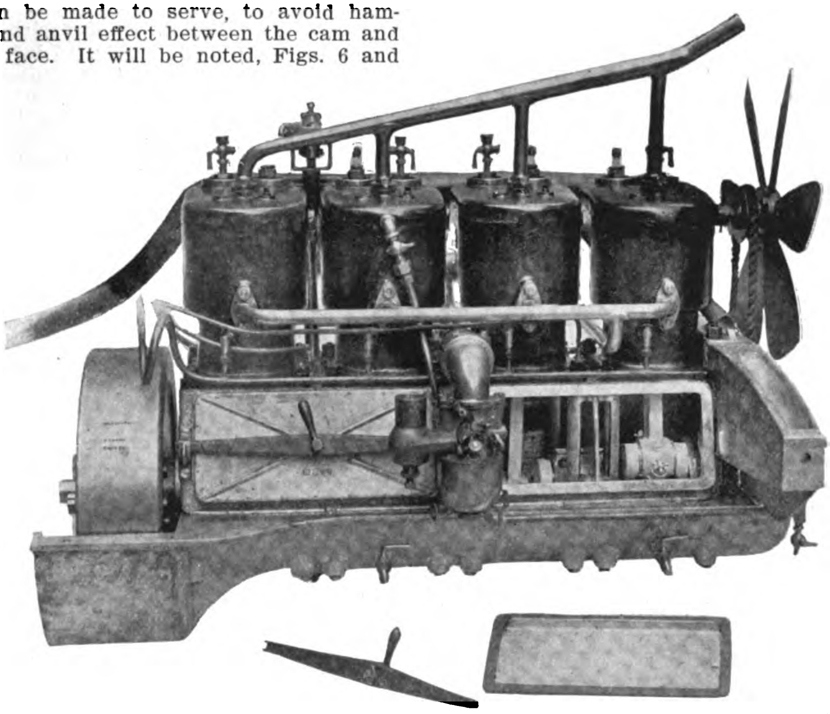

Fig. 6. Corbin 1909 30 H. P. motor, right side. The cylinders are individual units, cast with integral heads and water jackets. The commutator is on a long vertical shaft, spiral gear driven from the cam-shaft. The connecting rod crank-wrist caps are hinged at one end, access by removing the aluminum covers, which are held by pressed steel bars with their ends in hooked brackets, one screw in the middle. The plates are large and give free access to the crank-shaft and rod ends. The splash pits are fitted with drain screws. The oil basin is extended to the rear to cover the under half of the fly-wheel.

### CORBIN OILING SCHEME

The cylinder and rod oiling are by splash, two splash pools, each for two cylinders. In addition, each cylinder has an oil groove around it inside, always covered by the piston and supplied by an individual oil tube. The oiling scheme includes an oil reservoir under the toe-board, from which oil is forced by a two-pinion pump to a high reservoir on the rear side of the dash, with a return overflow from the high reservoir to the low oil tank. From the high reservoir oil descends through three needle valves, one oil lead to each dual splash pool and the third to the cylinder oil grooves. The pump and high reservoir give a uniform head of oil above the needle valves, ensuring regular delivery to the motor.

### THE 1909 DRIVE

The clutch is carried on a rear extension of the crank-shaft, on two circles of ¼ dia. balls. The clutch cone shaft, a steel drop-forging, transfers motion through an Oldham coupling to the gear box line shaft. The propeller shaft has Hartford universal joints at each end, and is 1⅛ ins. dia., solid steel. The live rear axles are 3.5 nickel steel, squared ends hardened, live axles "heat-treated," 1¼ ins. dia. solid. The stub axle and its vertical member are an integral steel drop forging, and the vertical member is not bored to take a pin, but is journaled at both ends, with a ball thrust bearing to take the load.

The Corbin bevel gear drive is very carefully designed, the bevel pinion being supported by two annular bearings in front and a third annular bearing in the rear. The balance gear is 8 spur pinions.

### THE SPRINGS

For the Corbin 1909 114-in. wheel base chassis the bodies vary so much in weight that the rear springs are varied for each

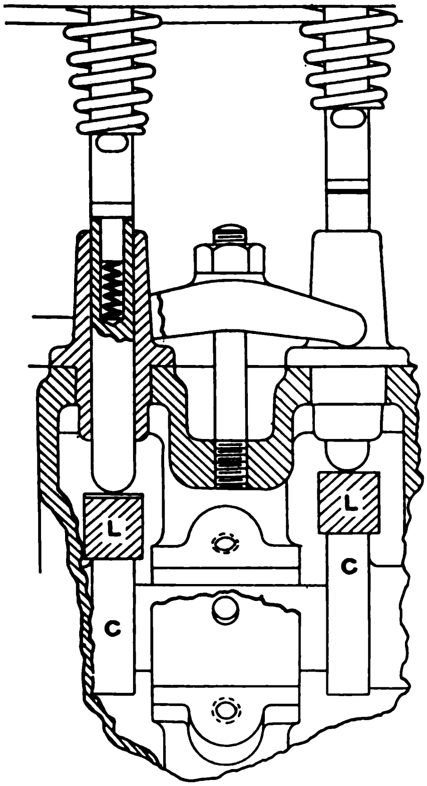

Fig. 7. This illustration shows the constant contact spring plunger seating. C, C, cams. L, L, horizontal hinged levers carrying hardened riders resting on the cams. Spring plungers, seated in the cylindrical lifters, which slide in the bronze guides. The light coiled spring under the plunger ends, while not strong enough to prevent valve seating, yet serve to maintain a constant contact between the valve stem end, the valve lifter, the horizontal lever and the cam, thus avoiding hammer action, clicking and wear; this is a light, low cost, durable and effective way to prevent valve action noise and rapid wear.

model. The 114-in. wheel base chassis front springs are the same as for the 108-inch wheel base chassis.

The front springs are half-elliptics, 40 ins. long x 2 ins. wide, either 5 leaves each ¼ thick, or 6 leaves, usually graded tongued and grooved, 3 leaves banded together, bottom leaf dowelled to the spring perch, no central hole through leaves and no central bolt, springs fixed on perches with two clips each, ½ in. clip-screws with hex. nuts on bottom, retained by screw end riveting. The springs are seated on interposed, gib-end, hollowed top, malleable casting pads, seated on top of the flat-faced spring perch. There is also a malleable iron strap on top of the spring, notched to take and retain the spring clip cross-members. The springs are jointed to the steel drop-forging side frame front eyes, and linked to the chassis frame brackets. The 40-inch front springs are perched 4 ins. out of middle, 16 ins. from front eye to axle centre. The spring eyes are bronze-bushed and the eye pins are case-hardened steel, spring oiler lubrication.

The 108-inch wheel base chassis rear springs are half-elliptics, 50 ins. long x 2¼ ins. wide, 9 leaves graded, same seat, cap, clips and dowels as front springs, save for increased width, and same clip nut retention. The rear springs are perched ½ inch off centre, are jointed to the chassis frame brackets in front, 25½ ins. from front spring eye to middle of spring perch on rear axle, and linked to the rear eyes of the chassis frame, which are steel drop forgings. Spring eye bushes, pins and lubrication are the same in the rear as in front.

### THE BRAKES

Up to 1908 the Corbin brake drum was an interior surface 12⅝ dia. surrounding an external drum, 8¾ ins. dia., so that both brake drums were enclosed. This was changed in 1908 to the form shown in Fig. 9.

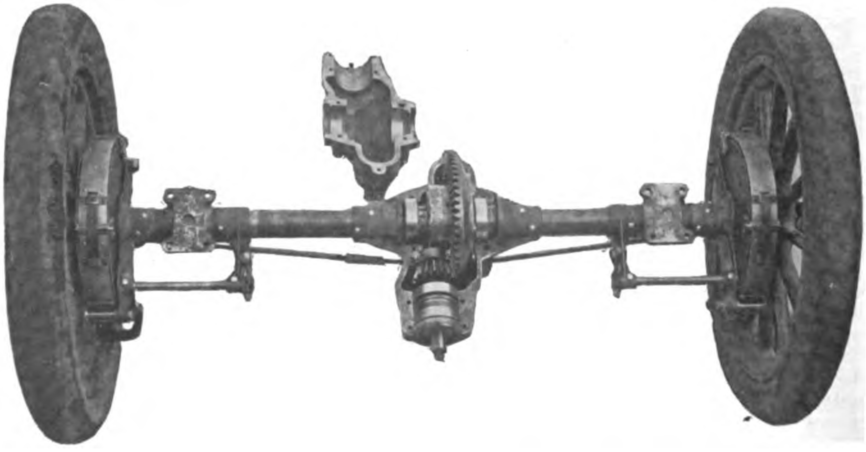

Fig. 8. Corbin 1909 Rear Axle Assembly. The bevel gear housing is two malleable iron castings, 3-16 general thickness. The 8-spur pinion balance gear drum hubs, own construction, are carried in two annular bearings, bevel gear thrust taken by a ball thrust bearing. The bevel pinion is on two annular bearings in front and one annular bearing in the rear. The steel tubular live axle housings are fixed in the gear housing hubs by boring and turning, shrinking and riveting. The spring perches are of malleable cast iron, revoluble.

### THE CORBIN MUFFLER

This is an original design, very light and inexpensive, with no back pressure whatever. See Fig. 10. The outer shell is 26 ins. long x 5 ins. dia., with two annular bulkheads. The central "tube" to which the exhaust is delivered is of heavy wire gauze, meshes ¼ in. sq. rolled up to 2⅜ out. dia. x 26 ins. long, and having two internal flanged heads of thin sheet iron. fixed inside this roll of heavy gauze by 4 copper rivets in each bulkhead. This assembly, with the co-acting annular and entire bulkheads in the outer and inner members respectively causes the exhaust to move outward and inward in its course from entrance to exit, thus obtaining the full cooling effect of the outer shell surface, and producing an efficient silencer. The cut-out is a bronze sleeve on the cylindrical forward extension of the front head, 2⅝ out. dia., which is finished. The cut-out port is rectangular, 3 ins. long x ¾ ins. wide, and is very noisy, making a sharp and efficient warning without the use of the horn. The illustration fully shows the muffler construction. The heads are of gray iron, and the total weight is about 16 lbs., cut-out sleeve included. The construction of the heads and the escape nozzle form are also shown.

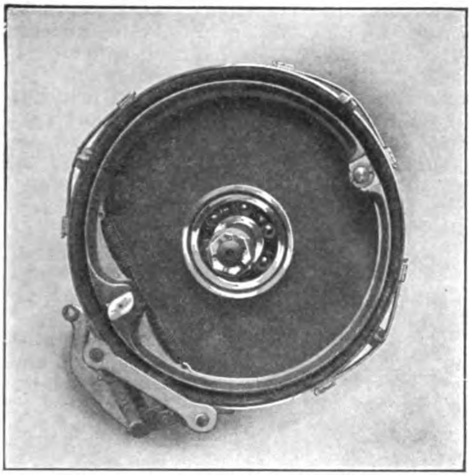

Fig. 9. Corbin 1909 Brake Construction. The brake drum is 12⅜ ins. dia. inside, 12¾ ins. dia outside, 1⅝ inside face, 2 ins. outside face. The inside, cam-rocker expanded shoe is a manganese bronze ring, with one coiled spring from end to end of the shoe, metal to metal contact with the pressed steel brake drum, bored and turned. The outside brake band, 70 carbon steel 2 ins. wide x 3-32 thick, operated by a crank-arm 1⅓ ins. radius, to leave the brake band "floating," or free to come to the drum surface. The exterior band has a fibrous lining, ¼ in. thick, and is supported by a spring ball on top which insures clearance when idle.

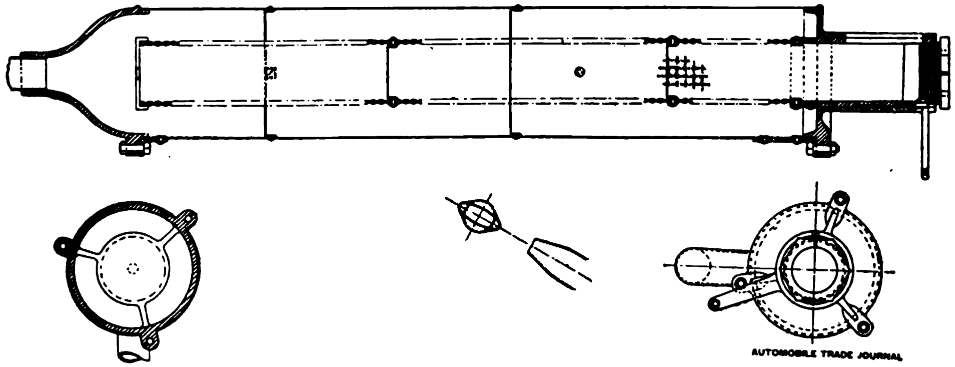

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Fig. 10. Section of Corbin 1909 Muffler. The inner tube into which the exhaust enters is made of a wire screen as described in the text.

### CONTROL

The common long control rocker, supported in the chassis frame sides, is replaced in the 1909 Corbin chassis by two short rockers, the forward one in the middle and carrying the down-hanging clutch disengaging arms with annular ball bearings which impinge the integral clutch cone shaft flange. This forward clutch rocker is linked to the short pedal rockshaft at the right.

The spark and throttle control levers are ratchet stationary sector retained on top of the steering wheel, which is 17 ins. for runabouts and 15 ins. for touring cars. The steering action is a hard steel worm, engaging a hard steel worm gear sector.

There are two hand levers, the outside one, latched, pulled backward to first disengage the clutch and then apply the internal emergency brake shoes. The inside hand lever, in two slots, is fixed to the horizontally sliding selective gear shift rocker, selection linkage enclosed in the gear box. There are two large pedals on the pedal rocker, the pedal pieces being gray iron. The left pedal is pushed forward to disengage the clutch. The right is pushed forward to apply the exterior fibre-faced brake band.

The horizontal accelerator pedal is placed between the two large pedals. The muffler cut-out is worked by a heel-operaated plunger.

### ON THE ROAD

The Corbin 1909 five-passenger touring car can do 55 miles easily, and it was intended to make a Hartford-Bridgeport round trip; 120 miles measured fuel run for this story, but unexpected events occurred which made it inexpedient to carry out this intention in full, and the run timed was only from Hartford to Bridgeport, 60 miles, Monday, November 30, 1908.

The 5-passenger Corbin left the Asylum Street viaduct, Hartford, at 11 A. M., Joseph Matson, driver, with the writer, in the front seat, and was driven fast about half-way to New Britain, 10 miles, when the right front tire blew out, and the remaining five miles to the Corbin Garage, New Britain, was made slowly. The tire was replaced, and with a third passenger the car was driven from New Britain through Meriden and New Haven to Bridgeport. The remainder of the sixty miles, in 100½ minutes, total running time, notwithstanding the slow five miles after the blow-out and a slow-down outside of North Haven, where a long stretch of new road is in process of construction.

The car ran perfectly in every particular, and is very easy riding both in front and in the tonneau.

The Corbin 1909 motor is silent and powerful enough to give all speed desirable, and the writer was anticipating much less than 100 minutes running time for the 60 miles from Bridgeport to Hartford when the return trip was cut short by a dash into a load of freshly dumped sand where the new road was making. The fresh sand was soft and splashed out on each side like water as our front axle struck the pile, with no injury to the car, but the sand splash had, unsuspectedly, opened the lever drain-cock of the forward splash pit so that all the oil ran out before we knew it, and forced a stop by lack of lubrication.

These lever drain-cocks are replaced by drain-screws in the Corbin 1909 motors, making accidental splash-pool drainage impossible.

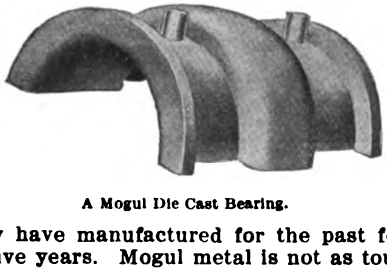
Circumstances did not permit a second 120-mile run, so that, greatly to the regret of all concerned, this Corbin "On the Road" story is not as intended.

The Corbin touring car averages 15 to 20 miles to the gallon of gasoline, and the light car-weight and quick motor-response go towards fuel saving.

## MOGUL BEARING METALS

Mogul Metal Co., 149-151 Larned street, West, Detroit, Mich., manufacture a number of grades of babbitt metal which have proved very satisfactory in automobile engines. Their No. 403 special nickel babbitt is very hard and tough with practically no shrinkage. No. 407 special nickel babbitt is not quite so hard, but has as little shrinkage.

Mogul bearing metal is used more especially in large stationary gas engines, but has also been successfully used by a number of prominent manufacturers of automobile engines. Some of them have used Mogul metal in all of the engines they have manufactured for the past four or five years. Mogul metal is not as tough as the first two mentioned, and if used in automobile bearings the lining should not be too light.



A Mogul Die Cast Bearing.

Mogul white brass is a very high grade bearing metal, extremely tough and with good anti-frictional qualities.

In addition to the manufacture of babbitt metals they are also equipped with special machines of their own design for making finished pressure die cast bearings from all grades of babbitt metal. They claim to be the only manufacturers of babbitt metal who make their own die castings, and as the success of die cast bearings depends largely upon the treatment of the metal as well as the mechanical process of casting, their die castings have especial merit.

Where a large number of one size bearings are used, this die casting process results in a great saving in cost to the manufacturer of engines as compared with the expense of machining them. These bearings are also perfectly accurate and absolutely interchangeable.

## ACHESON GRAPHITE GREASES

The International Acheson Graphite Company, of Niagara Falls, N. Y., is making a line of Graphited Greases, in the production of which they blend very soft, pure, amorphous, unctuous Acheson-Graphite with a high grade grease, the product containing no friction-creating impurities, as it is guaranteed at least 99 per cent. pure. Acheson-Graphite is a true lubricant in itself, the grease simply acting as a carrier. Acheson-Graphite, Grade "1340," is especially recommended.

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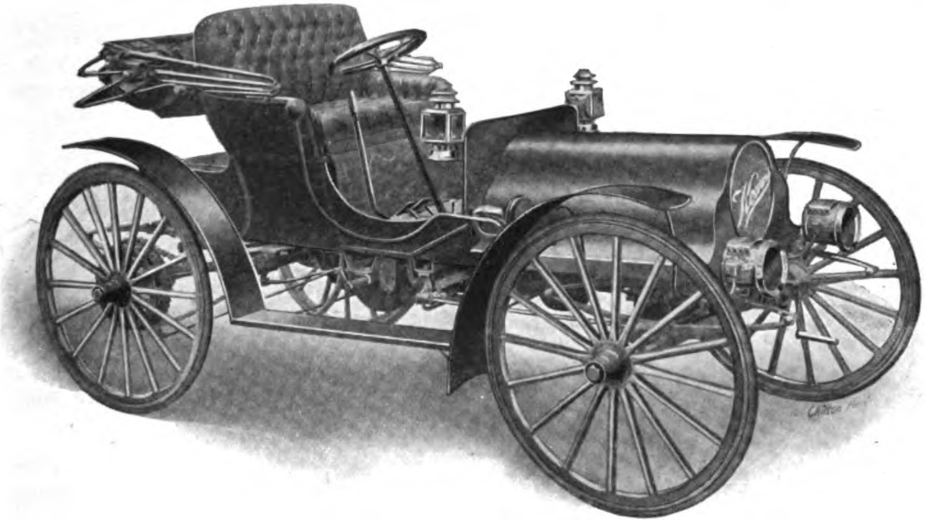
Barnett Drop Forging Co., Easthampton, Mass., are prepared to drop forge crankshafts up to 150 lbs. weight, connecting rods of all sizes, one-piece front and rear axles, and any light or heavy forging desired. They are making a specialty of automobile work and have turned out some beautiful work of which they are naturally very proud. A recently installed 5,000 lb. hammer gives them a greater range of facilities and they are able to meet any needs of this trade. They invite correspondence and will be pleased to quote prices on receipt of blue prints. All inquiries will be given prompt attention.

## 1909 KEARNS MODEL "L"

A new model by the Kearns Motor Buggy Co., formerly the Eureka Motor Buggy Co., Beavertown, Pa., is illustrated herewith. This new model is designed very closely after the graceful lines and simplicity of mechanism of the model "D." This new model is provided with a 1909 "Speedwell" 3-cylinder, 2-cycle, air-cooled motor, the bore is 3¾-in. and the stroke 4-in. The rated power is (15) H. P. at 1000 R. P. M. speeding the motor higher which is practicable a consequent increase of power being obtained. A Buffalo carburetor is used. The ignition is of the jump spark system and by the use of the "Connecticut" dash board coil and the "Lacoste" timer a very desirable and efficient means of sparking is insured. The steering wheel is of the spur pinion and segment type. The segment and lever are made from drop forged steel, and the pinion and segment are housed in an oil tight case thus insuring proper lubrication. A 16-in. hand wheel ebony finish with bronze spider and brass steering post are used. A novel feature of this gear is that it can be thrown forward while getting in or out of the car. The usual arrangement of spark and throttle levers on a stationary sector is used. The brakes are internal toggle expanded and act on each rear wheel. An emergency may be used by reversing the friction wheel across the disc on the reverse side. There is no harm done to either car or mechanism while using brakes in this manner. One and a quarter inch "Empire" ball bearing axles are used throughout. The front axle has a drop of 1½-in. and is a one piece drop forging having no welds. The cross steering rod is placed behind the front axle to provide against damage due to road obstructions. The frame upon which the mechanism and body are hung is made of 2 x 2½-in. angle steel well brazed and trussed throughout. The wheels are 36 ins. The rear ones are fitted with 1½-in. and the front 1¼-in. Kelly Springfield solid rubber tires. The transmission is of the friction type same as they have been using for the last two years on all their models. This device combines the purpose of the differential and the transmission of a machine. The power from the motor is transmitted to an aluminum disc which is placed on a cross member of the frame. A counter shaft carrying the friction pulleys is hung at right angles to the frame and has sprockets at each end upon which two chains run to the rear wheels completing the final drive. The pulleys on the counter shaft are divided into two independent halves revolving on the same axis and driven by the same disc, independently. In turning a corner the wheel giving the least resistance to the ground (the wheel describing the greater circle) causes its driving pulley to run ahead of its twin and causes the slower pulley to slip on the face of the driving disc. When running in a straight line, and the ground friction on the wheels is practically equal, the effect on the twin pulleys is as though they were bolted together and the driving friction surface centres at a point midway between the respective surface. The centres of the driving pulleys and the wheels travel at the same rate of speed.



The 1909 Kearns Motor Buggy, built by the company of that name, Beavertown, Pa. This car has several unique features such as a two cylinder air cooled, 2-cycle engine, twin friction disc transmission, 36-in. solid tired wheels. Drive from jack shaft to each rear wheel by side chains. No differential is used as the special friction change gear also includes this function.

The Eureka is notable for the mechanical features it lacks; it has no speed change gearings, no differential, no radiator, water tank, water pump or water jackets, no clutch, no live or divided axles, no valves, springs, gears and cams and no punctures. One lever controls all speeds both forward and reverse. Its simplicity makes it a city car for women as well as a country car for business men.

# Don't Guess Which Tire is Best—Here is Proof

**In New York City there are 1,000 Taxicabs.**

**On the tires, more than on any other one thing, depends the profit of the Taxicab business.**

**You may be sure that the owners of the 1,000 Taxicabs did not guess.**

**They TRIED all the tires that were offered, and checked them up with the TAXIMETER—which told them the mileage unerringly, indisputably.**

**There was no personal preference. No friendship. No prejudice. It was a cold-blooded BUSINESS test.**

**And the result, 800 out of the 1,000 Taxicabs in New York, operated by several competing owners, have contracted for Goodyear Tires to be used EXCLUSIVELY.**

To understand why the Goodyear tire stood head and shoulders above its competitors in this taxicab test, you must understand, first the difference between a moulded tire and a wrapped tread tire.

The moulded tire is built up, layer by layer, on an iron core. Over it is clamped an iron mould. And when the heat of the curing process is applied, that rubber expands—and in expanding, forces a perfect union between the various layers of rubber and of fabric.

You will realize the pressure that is exerted on the tire when you know that a two-inch cube of rubber, enclosed in an iron mould, with walls two inches thick, will crack the iron under the heat of the curing process.

With the moulded tire, so far so good.

But consider this: in building up that tire on the iron core, a skilled workman lays fabric on fabric, rubber on rubber. It is a feat of dexterity well worth watching.

Yet, skilled as he may be, he cannot wholly avoid wrinkles, irregularities, unevenness.

Wrinkles, irregularities and unevenness which, under the pressure of curing, multiply themselves into hidden weaknesses and defects.

It is these hidden weaknesses, these concealed defects that make you wonder, sometimes why one tire does 2,100 miles while its mate stands up for 12,000 to 15,000.

Some tires, instead of being cured on an iron core, are cured on an air bag.

The air bag is really only another name for an inner tube—an extra strong inner tube.

When the tire has been completely built up on this inner tube, strong tape is wound around and around it, and then it is cured in live steam.

The advantage of the wrapped tread process is that the air bag, full of compressed air, smoothes out these wrinkles and irregularities and prevents those hidden weaknesses and defects.

The advantage of the wrapped tread process is, for this reason immeasurable.

But there is one disadvantage which more than discounts the superiority:

The tire made by this process does not get the squeeze—the terrific squeeze that the moulded tire gets when the heat expands it between core and mould—the squeeze that forces the rubber into the fabric, making a perfect union between fabric and rubber.

In losing that squeeze, it loses durability, strength, unity—which more than offset the fact that the wrapped tread tire can have no hidden wrinkles or unevenness.

Obviously, the tire you ought to have is the built up on an iron core squeezed the same as a moulded tire—and finished on an air bag to smooth out the irregularities.

There is just one tire made in this way—only one. It is the Goodyear Quick Detachable.

This one point of superiority is reason enough why the Goodyear Quick Detachable should have won the Taxicab test.

But there are other reasons—other superiorities.

The Goodyear Quick Detachable is for example an oversize tire.

That is, the 32x4 size is really a 32x4½ tire—and other sizes are oversize, in proportion.

The Goodyear tire is made larger than the specifications call for. It is simply 15 per cent. larger, and 15 per cent. better than any other tire marked the same size.

There are countless other Goodyear superiorities.

There is, for instance, the Goodyear rubber-rivet breaker-strip, which makes it impossible for the tread to split or peel from the carcass of the tire. This exclusive Goodyear device, protected by patent deserves a full page of description here.

But it is cited merely as one of the Goodyear superiorities—superiorities which extend from the raw materials to the workmanship—from scores of exclusive Goodyear processes to the Goodyear piano-wire tape which would hold the tire on the rim, even if both the detachable flanges were off.

When you think of tire, think of that Taxicab test.

Those 800 Taxicabs in New York, are doing 60,000,000 tire miles a year!

More than 1,000,000 tire miles a week!

And what is true of the Taxicabs of New York is equally true of the Taxicabs of Boston, of Washington—of practically every large Eastern city where Taxicabs are used.

Eight out of every ten of them are using Goodyear tires exclusively.

Think of that, you who have bought tires because you have heard of their use on some tour or some race!

Think of that, you who have almost abandoned motoring because you have had the wrong tires.

Think of that, you who blindly groped at the tire problem—you who have bought tires wholly by hearsay!

Don't you see, now, that tire-buying has been reduced to a business basis?

Isn't the tire that the Taxicab took—isn't that the tire for you?

A hundred times more about tires than can be explained in a page like this, you will find in our book, "How to Select an Auto Tire."

Send for it now. It is free.

# The Goodyear Tire & Rubber Company

**Warwick Street, Akron, Ohio**

**The Goodyear Tire & Rubber Company,**
**Warwick Street, Akron, Ohio**

**I want to know more about tires. Send on your free book, "How to Select an Auto Tire."**

**Name**______________________________

**Address**______________________________

# DEALERS' & GARAGE DEPARTMENT

## SOLID TIRES ON CARS DESIGNED FOR PNEUMATICS

BY HUGO V. RODECK.

Although this subject has been discussed for some time, there are still a large number of automobile users who fail to look at it in its proper light.

Nearly all pleasure vehicles to-day with the exception of the buggy type are built for pneumatic tires, and will sooner or later give trouble or collapse if solid tires are attached by the purchaser who by that means hopes to avoid tire troubles.

Axles and steering knuckles, when subjected to that untrained hammering and vibration of solid tires will deteriorate in due time to such an extent that they eventually break. More than a dozen such breaks, which I've repaired, all showed the same kind of fracture, although the machines were of varied styles and makes. One a 40-horse power car, the owner insisted on putting solid tires on the front wheels (retaining pneumatics on the rear for easy riding), and after three months travelling at about 7 miles per hour on asphalt, and crossing car tracks with Belgian block pavement between both front wheels continued up the street, but the machine dropped, and only the strong front axle prevented further damage.

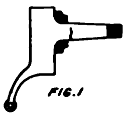


FIG. 1

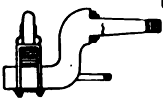


FIG. 2

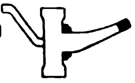


FIG. 3

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Both steering knuckles looked alike, showing a fracture of about two-thirds of the diameter of the axle, which was black, and a clean break of metal on the upper one-third. These axles were 1⅛ inches diameter. Figure 1 shows a sketch of the knuckle, indicating the fracture in line with the outer edge of the ball cone.

A rear axle break of the same appearance under exactly the same conditions is shown in Fig. 2. This break occurred on a 45-horse power car.

In addition to solid tires on this car, there was also a solid rubber bumper attached to the axle and this had actually dented the frame. This break was undoubtedly hastened by attachment of the bumper, as the spring on this side had flattened to a large extent, and the space between spring and frame was 2 inches less than on the other side.

Figure 3 represents a steering knuckle on a small one cylinder runabout. The front of this car being light, and having a platform spring distributing vibration, breaking the axles does not occur quite as often as with other cars with half elliptic springs. Nevertheless, most of them bend as indicated soon after attaching solid tires.

If full elliptic combined with platform springs could be used, then perhaps solid tires would give satisfaction up to a certain speed, but when a machine travels at more than 25 miles per hour, under present conditions of both autos and roads, pneumatics give better service.

As to cost, the factor of safety should be considered first, and a purchaser should not expect to change a car over to use solid tires when it was built to use pneumatics only. The average wheel on pleasure cars is not built to carry solid tires, and many a broken or wabbly wheel can be traced to their fault.

When a machine is ordered to be equipped with solid tires, the builders no doubt may be able to find suitable ways and means, and fit springs, etc., to counteract their effect.

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## KINZER & CO.'S AUTOMOBILE BUSINESS

George W. Kinzer & Co., of 390-392 East Main Street, New Holland, Pa., a short time ago embarked in the automobile business, selling automobiles and supplies and doing a general repair business. The business is financed and personally supervised by Mr. George Kinzer. The Buick cars have been the special line thus far carried and this firm enjoys the distinction of placing 14 cars during its short existence. The business is run in co-operation with the New Holland Machine Co.'s plant, (builders of gasoline engines) and large coach factories, thereby giving this firm special facilities for handling their specialty, namely, rebuilding, repairing, repainting of cars, upholstering and tops to best advantages.

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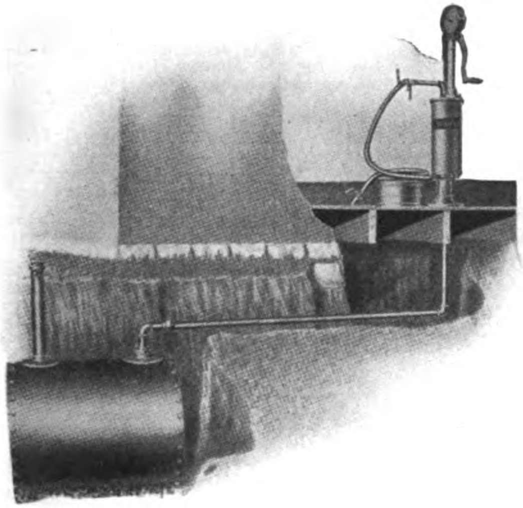
The Southern Tier Motor Co. of Elmira, N. Y., will feature the Overland car, not the Oakland as stated in our December number.

## WAYNE GASOLINE AND OIL OUTFITS

**Wayne Oil Tank & Pump Co., Fort Wayne, Ind., have a very extended line of self-measuring pumps and storage tanks for the storage and handling of all classes of oils and gasoline safely and economically. Only three of their styles are here shown but in addition to these they make various types suited to a wide range of requirements and individual preferences.**



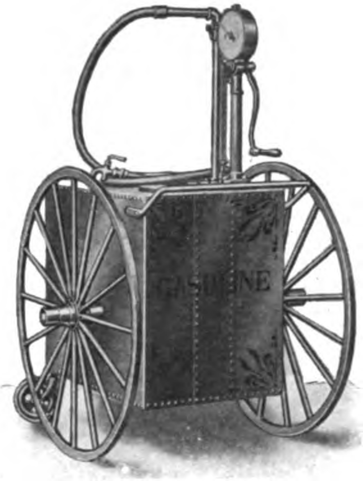
"Wayne" Model E. Long Distance Garage Outfit.

**The pump cylinders are all made of seamless brass tubing with all metal plungers where the character of the oil requires it and in some cases heavy metal plungers packed with leather. The nozzle of the pump is constructed with a view to preventing dripping after the stroke is finished. Stops are conveniently placed to allow immediate discharge of any desired quantity of oil or fuel in to the desired receptacle and also to allow instant change of measurement as desired. A computer is also provided which permits the discharge of any quantity or any amount of money's worth of fuel or oil without the use of the stops. This computer also tells just what amount of money's worth has been discharged into a tank or other receptacle so that the user of the pump can fill a tank and see at a glance just what to charge the customer.**

**A register placed in the head of the pump records the number of gallons discharged, and an indicator shows the amount of fuel in the tank at any time. The pumps are made of metal throughout and machine finished.**

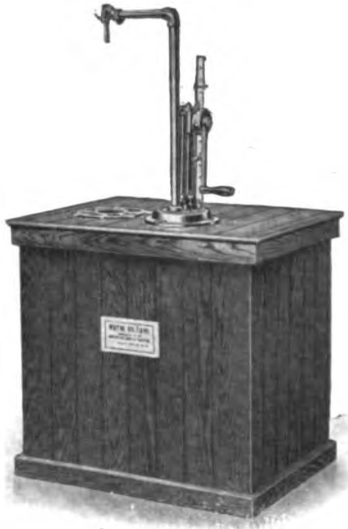
**Model E outfit, here shown, is a long distance outfit, the pump being placed inside and the tank buried about two feet deep outside. The filler tube has a heavy cast iron screw cap and locking device. It also has a vent valve and strainer. The pump has computer and register.**

**The Wayne Portable Tank and Pump, also illustrated, is of much interest to the motor trade. This outfit consists of a Model F placed on a heavy metal tank mounted on ball-bearing, cushion tired, wire spoked, metal rimmed wheels. The tank is of heavy galvanized iron, carefully riveted and soldered and painted with oil-proof paint. Any Wayne pump can be placed on this tank. The outfit is furnished with a two-way nozzle, ten feet of hose and brass bib.**



"Wayne" Model Portable Fuel Pump and Tank.

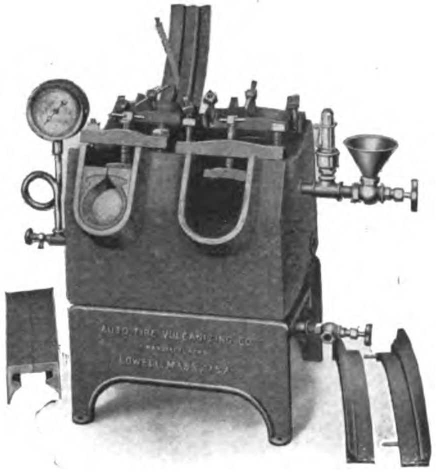
The Wayne Model F, First Floor Outfit, is adapted specially for garage and cellar use. It is fitted with a register and float gauge and is adjusted to measure quarts and half gallons. The pump is of metal construction throughout with perfect machine finish.



"Wayne" Model F. First Floor Outfit.

## IMPROVEMENTS ON THE "AUTO-TIRE" VULCANIZER

The cut herewith illustrates the 1909 model of the "Auto-Tire" sectional vulcanizer made by Auto-Tire Vulcanizing Co., Lowell, Mass. An important feature of this vulcanizer is the fact that the pockets and bead irons are machine finished in a lathe throughout, thus insuring a perfect fit and finish. Each pocket is fitted with two clamps which are adjustable so that a larger or smaller size casing may be cured in any pocket. Casings varying 1 inch or more in size, (also casings of both American and foreign make having flat treads and flat sides), may be cured perfectly. The clamps and screws are heavy and strong and the bead irons are fitted with dowel pins to assist in holding bead irons in place while handling casing and to keep casing in proper shape at all times.



1909 Auto Tire Vulcanizer.

These vulcanizers are made in three sizes. No. 4 has 2½-inch and 3-inch pockets; No. 5 has 3½-inch and 4-inch pockets; and No. 6 has 4½-inch and 5-inch pockets. Each pocket of each machine is fitted with three sets of bead irons; one each, for Clincher, Fisk and Dunlop or Goodyear style; so that any size tire of any make from 2¼-inch to 5½-inch may be perfectly cured in these machines. Each machine is provided with six sets of bead irons, four clamps, (two for each pocket,) base, steam gauge, pop safety valve, and globe valve and filler.

They are furnished to connect with steam boilers, gas or gasoline burners as ordered. The machines fitted to generate their own steam have an extra deep space under the bottom of the pockets to prevent burning that part of the repair before the rest of the patch is cured. These vulcanizers are steam jacketed and are cast in one piece; hence have no packed or bolted joints. Prices for the three sizes are respectively $90, $95 and $115 with steam boiler connections and $10 higher in each case with gas or gasoline burner.

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### GARAGE NOTES

The Abar Auto Co. will open a garage at Devil's Lake, N. Dakota.

J. W. Abbott has opened a garage in Sequin, Tex.

The Albert Lea Motor Co., of Albert Lea, Minn., will open a garage to be known as the Motor Inn. The building will be of concrete 36x80 feet.

A $50,000 garage with 24,000 sq. ft. of floor space, including supply store and repair shop, is being built for the Messrs. Erb and Drury of the Bakersfield Garage, Bakersfield, Cal.

The Bridgeprt Auto Co.'s garage, 388 Fairfield Ave., Bridgeport, Conn., has recently been purchased by W. Armstrong Smith from John L. Carpenter.

The Central Garage Co., of Chicago, has been incorporated with a capital stock of $1000.

The Franklin Motor Car Company of Kansas City, Mo., is to have what, it is claimed, will be the finest garage between New York City and the Pacific coast. Lewis A. Robertson is the Franklin dealer in that city and he is erecting upon Main street a building for this purpose, 120 by 165 feet in ground dimensions and made of steel, brick and concrete thruout.

The garage business of the Green Motor Car Co., 654-58 Bloomfield avenue, Montclair, N. J., has been taken over by W. H. C. Higgins, Jr. The business is to be conducted as the Montclair Garage and Machine Co.

Fred B. Henderson, of Denver, Colo., expects to erect a first class garage on the property which he recently purchased on Fifteenth street for $60,000.

John D. Hooker is erecting a new garage at Twelfth and Pico streets, Los Angeles, Cal.

E. S. Issenhuth of Redfield, S. Dak., is erecting an automobile garage and supply house. The building will measure 150x54 feet.

Owners of garages in Marshfield, Wis., have been notified that they will be given until July, 1909, to make their buildings fire-proof.

D. P. McClure, of Oskaloosa, Ia., is building a 60x120 ft. 2-story garage. The construction will be of brick, belted with Bedford stone. Buick cars will be sold as well as two lines of electrics.

The Murray-Connelly Garage, Newark, Ohio, has moved from the rear of 140 West Main Street to Elmwood court, between Third and Fourth streets and Church and Locust streets.

A new garage is being opened in Willimantic, Conn., by Frank Powell and Wm. B. Imer in the new building erected by S. J. Young on a site back of his hotel on Main Street.

D. F. Poyer, of Menominee, Mich., has taken possession of his new, large, brick garage and repair shop on Main street. The building cost $15,000.

The Queen City Garage Co., 216-24 North Center street, Cumberland, Md., announces that it has purchased from Dow and Broomell their interests in the Queen City Garage, and in the future will be known as the Queen City Garage Company.

A. R. Raff, of Philadelphia, Pa., will shortly erect a two-story, 29x61 ft. garage.

The Selvy Garage will be the name of the new brick and concrete, 50x125 ft. garage that is being erected for Hipkins and O'Connel, St. Paul, Minn.

The Standard Auto and Supply Co., of Tiffin, Ohio, has taken possession of its new two-story garage, 51x100, it recently built at 12 East Perry street.

The Standard Motor Car Co., Scranton, Pa., are building a two-story brick garage and concrete structure, 90x58 feet, on Dupont court, between Mulberry and Linden streets.

West and Vaiel of Springfield, Ill., have opened a garage next to their electric light plant. A fully equipped repair department will be maintained.

The Wyoming Valley Motor Car Co., on North Washington street, Wilkes-Barre, Pa., will shortly erect an addition to its present building.

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## RETAIL NOTES

G. B. Adams, who was formerly connected with the Pope and American Locomotive companies, has become connected with the Detroit-Cadillac Co., of 303 West Fifty-ninth street, New York City.

William Anthony, Greenwich, Conn., has purchased a building site at Greenwich Avenue and Elm street, on which he will erect an automobile salesroom for the Mechaly Auto Co., of Stamford, Conn.

The Auto Motor Co., has recently been organized in Boston, Mass., for the purpose of handling the Pennsylvania car. Offices have been fitted up in Park Square near the Motor Mart.

The Bennett Auto Supply Co. of Sioux City, Iowa, has been incorporated with a capital stock of $25,000 and will establish an automobile supply store in the Auto Building, 315 Nebraska street, in charge of Messrs. Bennett and Douglas.

The Brown-Hurley Hardware Co., of Des Moines, Ia., will erect a large building for handling a complete line of automobiles.

The Buick Motor Co. has established a branch in St. Louis, at the corner of Twelfth and Locust streets, opposite the Jefferson Hotel, in charge of H. M. Blake.

The Catskill Auto Co., Catskill, N. Y., has been formed for the purpose of handling the E.-M.-F. line.

E. D. Carlough, agent for Franklin Cars in Paterson, N. J., has moved into the new building at 175 Van Houten street. The building is a one-story cement structure, 25x75 ft. and contains an office, show rooms and repair shop.

The Chalmers Auto Co. of La Fayette, Ind., has recently been organized for the purpose of selling automobiles and auto supplies.

The Cox Automobile Company, of Harrisburg, Pa., has secured the agency for the Stoddard Dayton car.

The Dey Motor Car Co., of Kansas City, Mo., is building a new garage which it expects to occupy in a short time. This company represents the Pierce line.

The Dietrich Motor Car Co., Allentown, Pa., agents for the Franklin line, is building a fireproof garage, 50x250 feet. The building will front on three streets.

The Ford Automobile Equipment Co. of Chicago, Ill., has been incorporated with a capital stock of $2,400, and will manufacture, repair and deal in motor cars, etc.

The Forrest City Motor Car Co., of Massillon, Ohio, has opened a branch at 2174-80 East Ninth street, Cleveland, Ohio. Mr. O. F. Watts is manager.

The Foss-Hughes Motor Co., Providence, R. I., have opened a show room and office at 27 Washington street.

Gotfredson Bros., of Green Bay, Wis., are contemplating conducting an automobile salesroom and garage in the building on Jefferson street, at the corner of Main street.

The Grout Automobile Co., has opened a Philadelphia branch at 1521-23 Spring street, with Wilson H. Stayle in charge.

A. B. Henley, manager of the Franklin Co.'s, Boston branch, recently announced the removal of the company's repair shop from 61 Wareham street to the Copley garage at 31 Irvington street.

The Jewell Motor Car Co., of New York City, has recently been formed for the purpose of handling the full line of Jewell models made by the Forrest City Motor Car Co., of Massillon, Ohio. The agency is located at 1662 Broadway and is managed by J. P. Stoltz.

The Lexington Lumber and Mfg. Co., Lexington, Ky., has opened a first class garage and automobile agency in that city, with a capital stock of $10,000. The main store of the concern is centrally located, being in the Phoenix Hotel Block.

The Levy and Hipple Motor Co. of Chicago, Ill., which is now located at 390 Wabash ave., has purchased the property at 1467 Wabash avenue, and will erect its own building. The company has the agency for the Lozier, Chalmers-Detroit and the Autocar.

The Lewiston Automobile Co. of Lewiston, Mont., is building a large stone garage. The company intends to handle the Franklin.

The Monarch Motor Co. of Milwaukee, Wis., has recently been incorporated with a capital stock of $20,000.

The E.-M.-F. cars will be handled in Baltimore by the Motor Car Co., which has secured as territory the entire state of Maryland.

The Olds Motor Works have established a factory branch in Louisville, Ky., in charge of Frank Glenn, Jr.

Dr. C. W. Payne and J. L. Stevens, of Boone, Ia., who recently incorporated the Boone Auto Co., will open an agency for the Buick, Maxwell and Stoddard-Dayton cars. A garage and repair business is also to be conducted.

A motor mart is to be built in Minneapolis, Minn., at First Avenue and Tenth street south, the lease for which has been taken by H. Paulman and Company, of Chicago, agents for the Pierce Arrow. The building at present will be one-story high 100x159 ft. to cost $25,000.

The Peerless Motor Car Co. has purchased an L shaped piece of property with a frontage of 70 feet on Broadway, New York and 25 feet on Fifty-seventh street. An eight-story fireproof building, with every modern convenience, will be erected thereon.

The Pensacola Auto Co., of Pensacola, Fla., is being organized to take charge of the sale of the White Steamer and other lines.

Post and Lester, Boston, Mass., well known accessory dealers, will soon move to larger quarters in Park square.

The Puerner Heid Automobile Co., of Jefferson, Wis., has been organized for the purpose of handling the Buick line.

The William R. Reuss Co., of 1028-32 So. Main street, Los Angeles, Cal., will handle Pope cars in that vicinity.

The Rhode Island Machinery Co., of Pawtucket, R. I., has been incorporated with a capital stock of $25,000 and will manufacture and deal in motor car supplies, etc.

F. T. Sanford, well known to the automobile trade of New York, has opened a salesroom and garage on Forty-third street, New York City, where he has the agency for the Thames six-cylinder cars.

Earl V. Shue, who was recently appointed local agent for the Cadillac in Des Moines, Iowa, will soon take possession of his garage at 916 Walnut street.

The Standard Motor Co., of Philadelphia, has opened salesrooms at 616 North Broad street, under the management of Wm. P. David. The new concern handles the Middleby line.

The Stearns car will be represented in Kansas City by George Teblau, with salesrooms at 716 Grand Avenue.

W. F. Tedford, of Little Rock, Arkansas, is planning a two-story brick bluiding to be used for an automobile salesroom and garage.

The Winton Motor Carriage Co. has moved its Minneapolis branch to its new building at 18 Eighth street, North.

The Stearns line will be represented in Milwaukee, Wis., by the Wisconsin Automobile Co. This company is erecting a two-story garage, 50x100 ft. on Wisconsin street.

The Zell Motor Car Co., Baltimore, Maryland, E. Stanley Zell, President, is building a 3-story, 50x100 foot garage, at a cost of $50,000. The building will be located on the South side of Mount Royal avenue, between St. Paul and Charles street, Baltimore.

## NEW AGENCIES

Providence, R. I.—Hitchcock-Banks Motor Car Co., 179 Aborn St.; Knox.
Parkersburg, W. Va.—Sherman Dils; Franklin.
Minneapolis, Minn.—Jordan Automobile Company; Franklin.
Buffalo, N. Y.—Brunn Automobile Co., 1140 Main St.; Franklin.
Minneapolis, Minn.—Victor Stranquist, 110½ Sixth street S., Corbin cars.
Des Moines, Iowa.—American Motor Car Co., 918 West Walnut street, Cadillac.
Wilmington, Del.—Bradford Automobile Co.
Los Angeles, Cal., Rene A. Brassy, Olive street between 8th and 9th, Thomas.
Jackson, Mich.—Geo. P. Stoffan, Ford cars.
Reading, Pa.—Reading Automobile Co., 26-28 South Fifth street. Franklin.
Minneapolis, Minn.—Fawkes Automobile Co. American cars.
White Plains, N. Y.—Charles H. Paul Mammoth Garage. E. M. F. cars.
Newark, N. J.—The Auto Exchange, 265 Halsey street. Selden cars.

## MITCHELL CO.'S FIRST BRANCH

The Mitchell Motor Car, Co., of Racine, Wis., has decided to operate a branch store and warehouse in Atlanta, Ga., to be managed by James M. Cram. The branch will be the distributing center for Georgia, North and South Carolina, Alabama, Louisiana and Florida.

Pfanstiehl Electrical Laboratory, North Chicago, Ill., have appointed Bi-Motor Equipment Co., of 177 Portland street, Boston, as New England distributors of Pfanstiehl spark coils.

The Forrest City Motor Car Co., Massillon, O., has opened a branch at 2174-80 East Ninth Street, Cleveland, Ohio, known as the Jewell Motor Car Co., of Cleveland. The branch is under the management of Mr. O. F. Watts.

The Jewell Motor Car Co., of New York, is the name of the New York branch recently opened at 1662 Broadway by the Forrest City Motor Car Co., of Massilon, Ohio. The branch is managed by Mr. J. P. Stoltz.

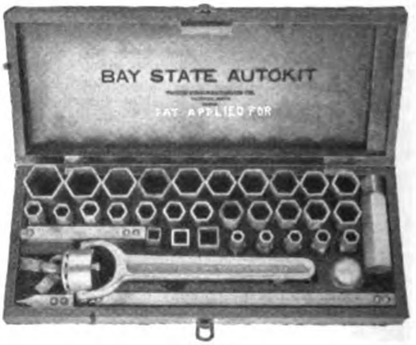
The Good Tire Repair Co., 56th Street and Eleventh Avenue, New York City, are in position to make tire repairs of every description, in the least possible time and at the lowest price for high grade work. They use the latest shop equipments and processes and the highest grade of materials.

Hoyt Electrical Instrument Co., Penacook, N. H., have opened a branch office at 161 Summer street, Boston, Mass., to take care of their New England trade. The demand for Hoyt battery gages and other electrical instruments in New England has shown such a steady and substantial growth that the Boston branch office has become a necessity. The office is in charge of H. F. Kellogg, a pioneer in the electrical field and well known in the automobile industry. A complete stock of instruments will be carried.

## NEW SOCKET WRENCH OUTFIT

A new socket wrench outfit called the "Bay State Autokit" has been placed on the market by Tudor Mfg. Co., of Taunton, Mass.

Its chief features are a reversible ratchet which can be moved up or down the shank to any desired point, depending on what part of the machine one wants to get at, extension shanks to give 18 inches complete length without any socket attachment, a universal drop forged steel handle which folds neatly against the shank or can be removed if necessary when replacing in case. This universal handle will in most cases do away with the universal joint, although to make the set as complete as possible a universal joint is also furnished. Thirty steel sockets are included which fit any nut on any car, also a spark plug steel socket and substantial square shank screw-driver warranted not to break, as well as other parts to make the Bay State Autokit complete. A new method of holding sockets is the use of spring balls. The material used is of the highest grade. The case itself is original, strong and attractive with a dull black finish outside and mahogany finish inside.



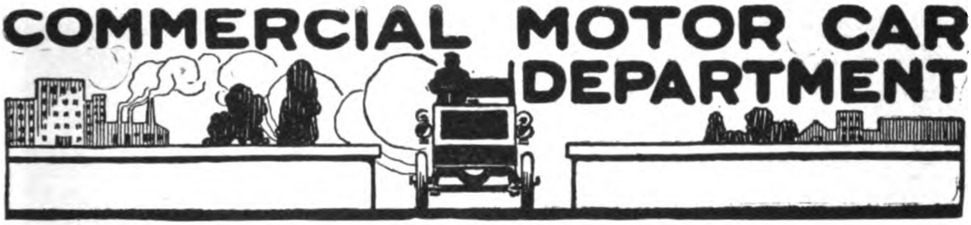
The Bay State Autokit.

Cuts are ready for 1909 jobbers' catalogues and the first shipments will go out the early part of January.

An Eastern branch has been opened by Perfection Spring Co., of Cleveland, Ohio, in the Oliver Building, Boston, Mass.

Thomas B. Jeffery & Co. have established a Boston branch at 95 Massachusetts avenue, the establishment formerly occupied by the Morrison-Price Co.

The B. F. Goodrich Co., Akron, Ohio, has established the following branches: Kansas City, Mo., 1728 Grand Avenue, Fritz Oberhue, manager; Minneapolis, Minn., 827 Hennepin Avenue, E. W. McCreery, manager; Pittsburg, Pa., 5900 Penn Avenue, H. L. Bouker, manager; Atlanta, Ga., 64 North Pryor Street, E. V. Wilkinson, manager.



# COMMERCIAL MOTOR CAR DEPARTMENT

## "MOTOR CAR VERY USEFUL—COULD NOT AFFORD TO USE THE HORSE"

Such is the verdict pronounced by Mr. C. B. Gladding, of Geneva, Ohio, who uses his motor cars both for business and pleasure purposes. Mr. Gladding has owned at least six cars during the last five years, and is getting the most satisfaction out of those he has now. At the present time he is running a Ford Model O and a Ford Model N. The Ford Model O is a 6-cylinder machine, of 40 H. P., and costs $3000. This machine carries six people. The average monthly cost for gasoline for this car is $8.00. The runabout Model N, is fitted with a 4-cylinder motor of 15 H. P., and carries four persons. It costs $600. Both cars average 40 miles per day. About 3 trips are made per day. Lubricating oil figures to $2.00 per month for both cars, and repair work and parts, the same.

The horse drawn equipment replaced, consisted of three horses and two wagons. Two to four passengers were carried. About 15 to 20 miles were made daily and about two trips. The vehicles cost $200; horses, $150 each; harness, $15.00 to $40.00 per set; cost of feed per month per horse, $6.00; shoeing, 50 cents each, and repairs to each vehicle, $1.00 per month. The most needed improvement in motor cars suggested by Mr. Gladding, is lower gearing, in order to give more pulling power rather than speed. Mr. Gladding stores his cars in his barn. He states that the motor car makes more time than the horse and affords lots of pleasure in driving.

## RAPID MOTOR CAR IN SUCCESSFUL USE BY INDIANAPOLIS DEPARTMENT OF PUBLIC SAFETY

The Indianapolis Department of Public Safety, Indianapolis, Ind., has used a Rapid 24 H. P. gasoline car for the past nine months to its entire satisfaction. The car is used for patrol work; hauling prisoners to the station and work house.

The car costs $2400. The motor is of the 2-cylinder opposed type, set under the body. About 14 men are carried per trip. Somewhat over 35 miles per day are covered, averaging about 10 trips and 2 calls per trip, all within a 10-mile radius. The following expenditures are figured on an average monthly basis: Gasoline, $16.50; lubricating oil, $3.00; repair work and parts, which includes Prestolight gas tank and all accessories, $26.62; operators' wages, a sergeant at $100 and a patrolman at $85.25; recharging of ignition battery, 50 cents and cost of new tires, $250 per set. This department figures the tires to last about 15,000 miles.

By the installation of this car, five horses and two wagons were replaced. The average load carried with one of these teams was 600 pounds, as against 2100 carried by the automobile. An average of 35 miles per day were made with all five horses in use. The same number of trips, calls and radius of miles traveled were made per day with the horse drawn equipment as with the motor car. The wagons cost $350 each; horses, $225 each; harness, $30.00 per set; monthly cost of care and feed of each horse, $100 per year; cost of shoeing each horse per year, $48.00; monthly cost of repairs to each vehicle, $30.00; monthly wages of drivers, $85.00, and helpers, $85.00. Mr. Robert Metzger, chief of the department, says that the way to keep a car in continual service is to always keep it well cleaned and oiled. The car is stored at the police station. Mr. Metzger says the motor car is 90 per cent. more serviceable than the horse, and that the car he has is entirely satisfactory. From the beginning of January, 1908, to September, this department made 2757 calls, hauled 3650 prisoners, hauled 1972 prisoners to the workhouse and covered over 9000 miles.

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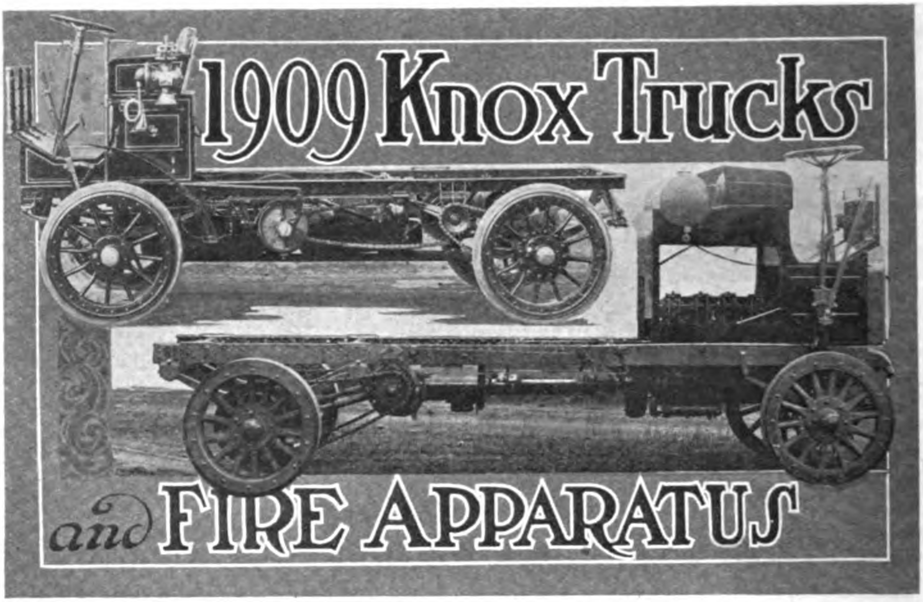
The Police Commissioners, of Burlington, Vt., are authorized by the Board of Aldermen to investigate the different makes of gasoline patrol automobiles and would like to hear from manufacturers.

One of the handsomest and most common-sense commercial car catalogues that has made its appearance is the initial catalogue of Grabowsky Power Wagon Co., of Detroit, Mich., one of the latest entrants into the commercial car field. It is printed on the finest enameled paper and contains a number of excellent half-tone cuts which plainly illustrate the distinctive features of the Grabowsky cars. On the page facing each illustration are given the descriptive details relating to the car or part illustrated.



BY HUGH DOLNAR.

The 1909 line of commercial vehicles of the Knox Automobile Co., of Springfield, Mass., includes seven types of business wagons and trucks, and a variety of fire apparatus and other vehicles for municipal service. The Knox commercial chassis are of one, two and four cylinder types, the policy of the Knox Company being to furnish to each individual user the most economical and efficient type and size of machine for that particular user's work.

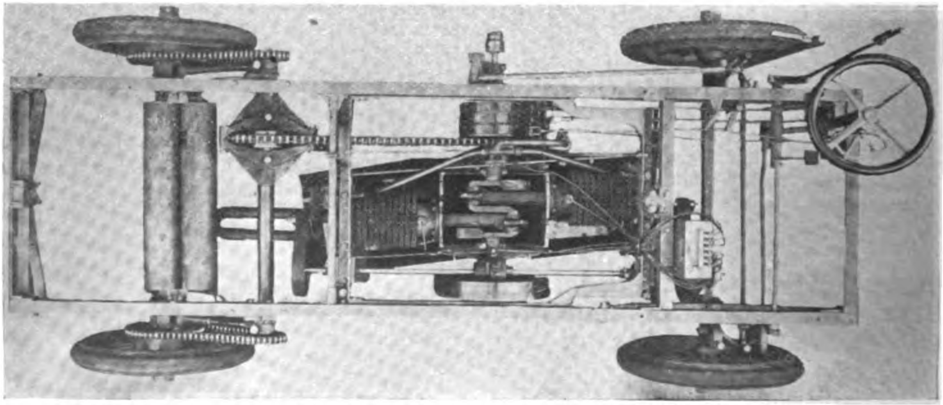


Fig. 1. Plan view of the Knox 2-cylinder, air-cooled chassis.

Knox heavy trucks have been in process of development for over two years. Both water and-air-cooled motors are used, the larger trucks having 40 H. P. air-cooled or 50 H. P. water-cooled motors. The lighter vehicles represent an even more extended experience and their performances are well known. They have one and two cylinder motors of 8 and 20 horse power.

Model 20, a single cylinder chassis is furnished with open or covered express body or panel delivery top, the price in each case being respectively $1,650, $1,700 and $1,800.

On the 2,500 and 3,000 lb. chassis a 20 H. P., 2-cylinder air-cooled motor, three point suspension power plant on sub-frame as illustrated. The motor can be detached from the chassis for overhauling and another motor installed in about an hour. This construction is a decided advantage where a number of cars are in operation for by having one or more spare power plants all the cars may be kept in commission practically all the time. A plane-

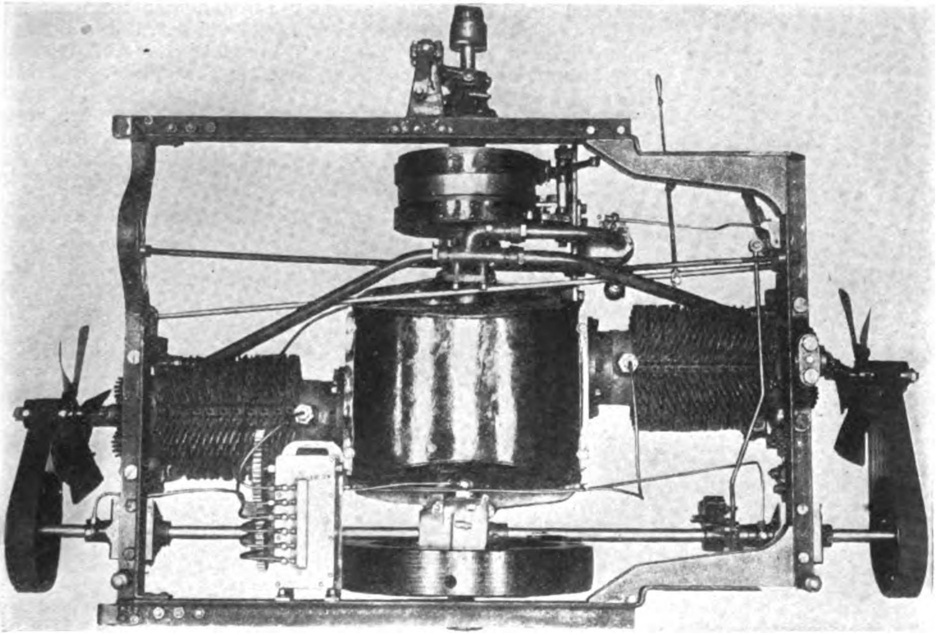


Fig. 2. Complete power plant of the Knox 2-cylinder commercial cars. The entire assemblage is placed on a sub frame and can easily be removed and replaced by a spare outfit if desired.

tary speed change gear is used on these chassis and can be detached without disturbing other parts. It gives the usual two speeds and reverse. A great variety of bodies are furnished on these chassis, meeting practically all requirements.

The following table taken from the Knox 1909 catalog concisely sets forth the sali-

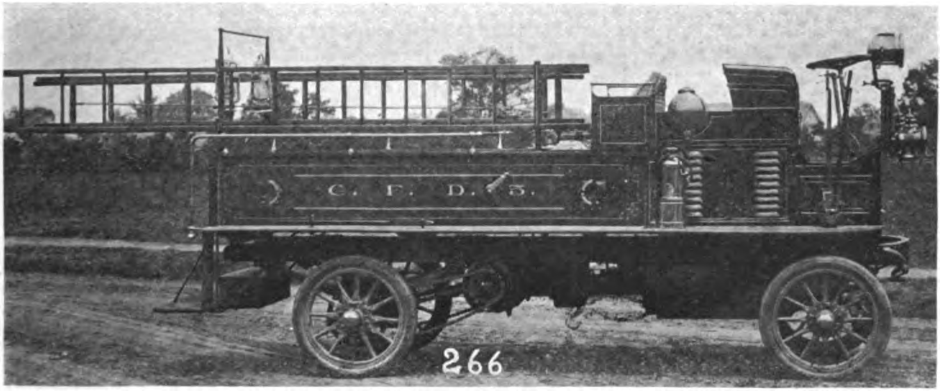


Fig. 3. Knox 1909 Model "G" Combination Hose and Chemical Truck. Capacity two 25-gallon chemical engines, 200 feet chemical hose, 1,000 feet water hose, 10 men. Wheel base, 125 inches. Gauge, 60¾ inches. Tires, solid, 34 x 4 inches, front and rear. Engine cylinders, four air cooled. 4¾ x 5½ inches. Maximum speed 30 miles per hour. Equipment complete, as shown in cut, not including water hose. Price, complete, $5,500.

| Capacity lbs. | Wheel base inches | Tread inches | Tires inches | No. Cyl. | Cyl. dim. | H. P. | Weight Chassis | Price of Chassis | Size of body standing platform | Price of stand'd form of express body |
|---|---|---|---|---|---|---|---|---|---|---|
| 10.000 | 154 | 67 | 36x5<br>36x4* | 4 | 5½x5½ | 50 | 5,600 | $4,300.00 | 14.6 ft. x 72 in. | $350.00 |
| 8.000 | 154 | 67 | 36x4* | 4 | 5½x5½ | 50 | 5,400 | 4,000.00 | 14 ft. x 72 in. | 300.00 |
| 6.000 | 149 | 67 | 36x3½* | 4 | 4¾x5½ | 40 | 5,100 | 3,750.00 | 12 ft. x 72 in. | 250.00 |
| 4.000 | 125 | 60¾ | 34x4<br>34x5 | 4 | 4¾x5½ | 40 | 4,200 | 3,500.00 | 10 ft. x 56 in. | 250.00 |
| 3.000 | 100 | 56 | 34x3½<br>34x4 | 2 | 5x7 | 20 | 3,260 | 2,600.00 | 9.3 ft. x 56 in. | 200.00 |
| 2.500 | 97 | 56 | 32x3½<br>32x3½ | 2 | 5x7 | 20 | 2,100 | 2,200.00 | 9.8 ft. x 44 in. | 200.00 |
| 1.500 | 85 | 56 | 32x3<br>36x3 | 1 | 5x8 | 8 | 1,800 | 1,400.00 | 7.3 ft. x 44 in. | 200.00 |

* These cars have dual tread tires on the rear wheels.

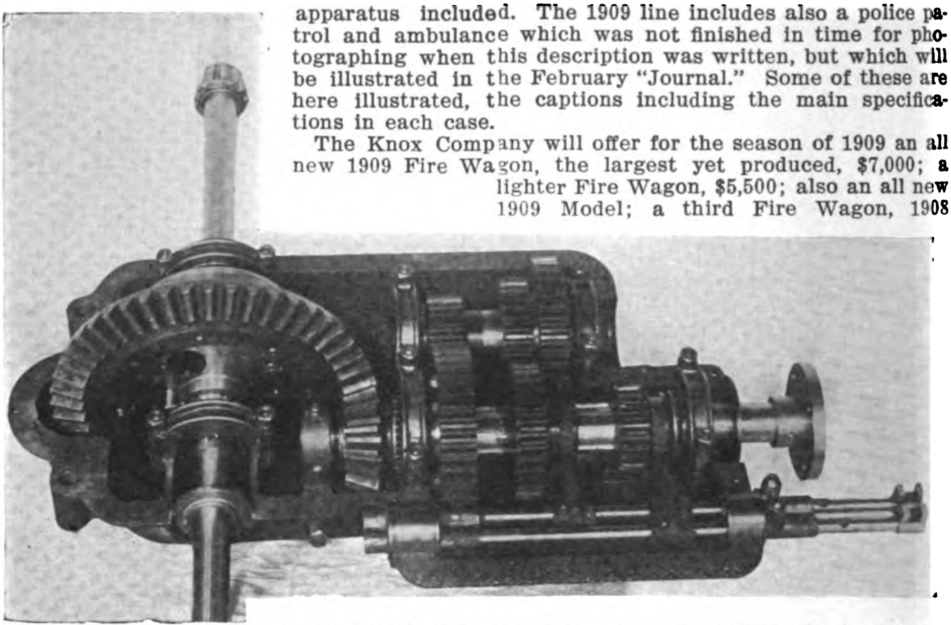


Fig. 4. Knox selective type truck gear set; three speeds ahead and one reverse; large gears are used and they are made of nickel steel; Timken roller bearings; clutch encased in flywheel.

ent features of each type of chassis furnished. One of the 4-cylinder and one of the 2-cylinder chassis are illustrated in the engraving at the head of this article.

A most interesting group in the Knox commercial line is the assortment of fire apparatus included. The 1909 line includes also a police patrol and ambulance which was not finished in time for photographing when this description was written, but which will be illustrated in the February "Journal." Some of these are here illustrated, the captions including the main specifications in each case.

The Knox Company will offer for the season of 1909 an all new 1909 Fire Wagon, the largest yet produced, $7,000; a lighter Fire Wagon, $5,500; also an all new 1909 Model; a third Fire Wagon, 1908 model continued, $5,000; a fourth all new 1909 Fire Wagon, $4,500; a fifth 1909 model, all new, a Fire Wagon on pneumatic tires, $5,500; a Fire Department "Auxiliary Squad" Motor Car with seats for 6 passengers and a driver, new 1909 model,

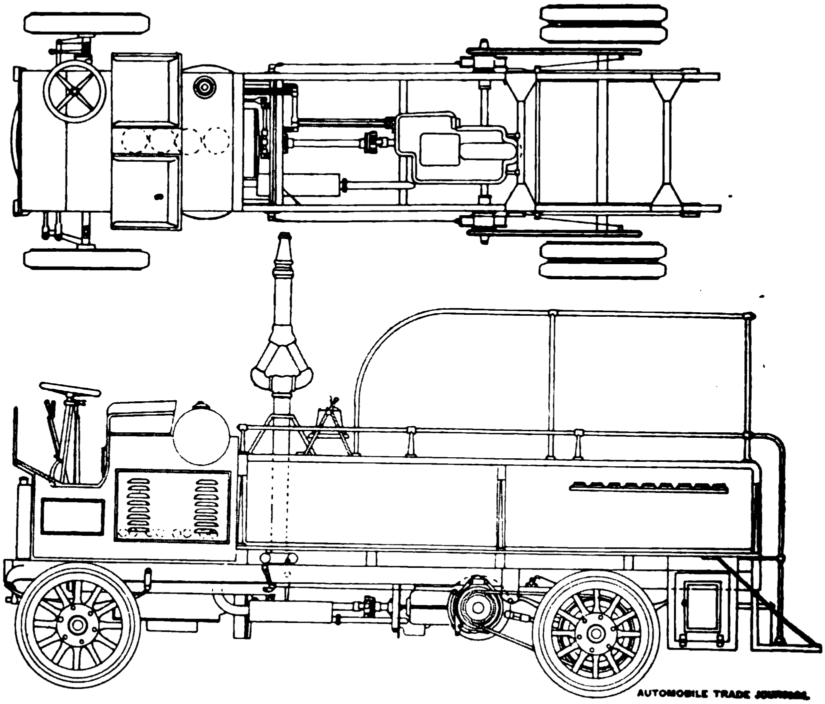


Fig. 5. Knox extra size fire wagon fitted with monitor nozzle and carrying 2,000 feet of 3-inch hose. May be equipped with triple plunger pump, can carry 20 passengers; speed 25 miles per hour. Wheel base, 149 ins.; gauge, 67 ins. Tires all solid, 36x4 ins. front, dual 36x3½ ins. rear. Motor 4 cylinders, 4 cycle, water cooled, 60 H. P. The drive is a clutch to the 3 forward speeds and a reverse sliding gear box, bevel gear to countershaft with bevel balance gear and sprockets and side chains to the rear wheels. Weight about 8,000 lbs. Price, without pump, $7,000. Price, with pump, about $8,000. Chassis plan is shown above car cut.

$4,500; a Fire Chief's Car, continued from 1908, seats for 3 passengers and a driver, $2,750; a Police Patrol Motor Car, an all new 1909 model, 9 passengers and a driver, $4,650; and a full line of motor ambulances, comprising four different models, at from $4,000 to $5,000 each, none of these Knox 1909 model motor ambulances being ready for illustration at the time of writing, December 7, 1908, but all of which will be ready for delivery early in 1909.

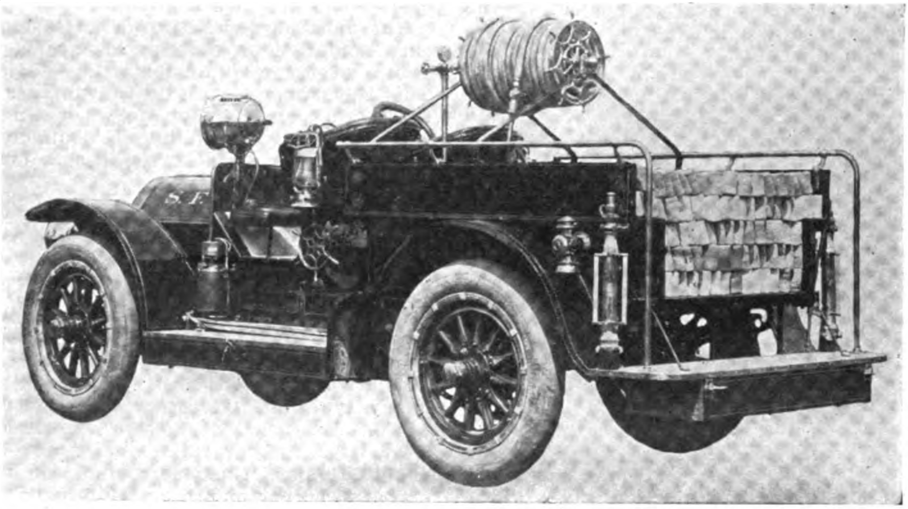


Fig. 6. Knox 1909 "G" Combination Car. Capacity, 1,000 feet water hose and five men. Wheel base, 112 inches; gauge, 58 inches; tires, pneumatic, 40 x 6 inches, Fisk Heavy Car Type, with demountable rims. Engine cylinders, four, air cooled, 4¾ x 5½ inches. Maximum speed, 30 miles per hour. Equipment, one 35-gallon chemical engine, 200 feet hose, reel and nozzle, pony extinguisher, axe, door opener, lanterns, etc. Price, complete, $5,500.

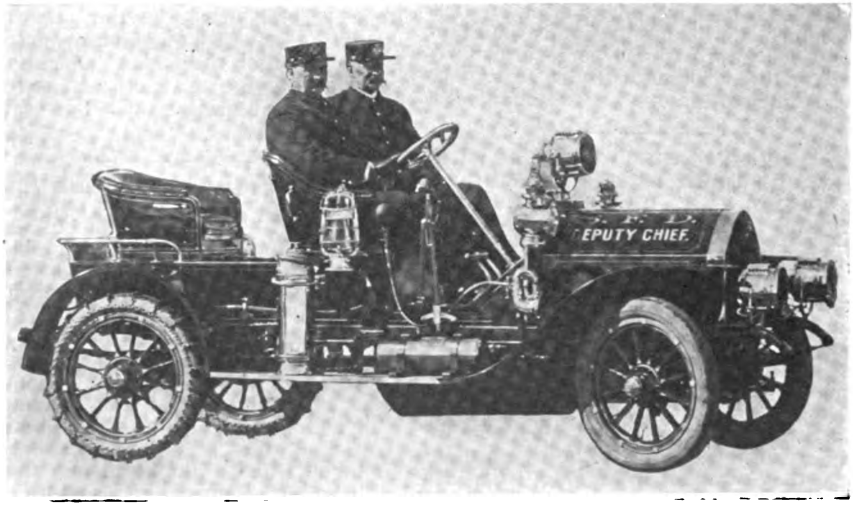


Fig. 7. Knox 1909 "H" Fire Chief's Car. Capacity, three persons. Wheel base, 102 inches; gauge, 56 inches. Tires, 32 x 4 inches. Engine cylinders, four 4⅝ x 4⅝ inches. Maximum speed, 45 miles per hour. Equipment complete, as shown in cut, including horn. Price, $2750.

This extensive and varied line of Knox Civic Motor Vehicles, the largest and most complete yet offered by any automobile concern in the world, is the outcome of long continued and costly experiments and successful constructions constantly improved, continued with vigor and unremitting care since July, 1906, when the possibilities of the motor car for city departmental use began to be dimly comprehended.

The two larger 1909 Fire Wagons can have triple plunger pumps driven by the car propulsion motor itself, so that the one fire wagon can be a complete fire fighting assembly, including a hook and ladder equipment, chemical engines and a powerful water throwing pump, driven by the vehicle motor itself, an air-cooled or water-cooled motor of from 40 to 60 H. P.

The Knox engineers regard the air-cooled motor as the more suitable for fire wagons, as in winter the emergencies of fire fighting may lead to neglect of the wagons resulting in freezing of radiators and water jackets.

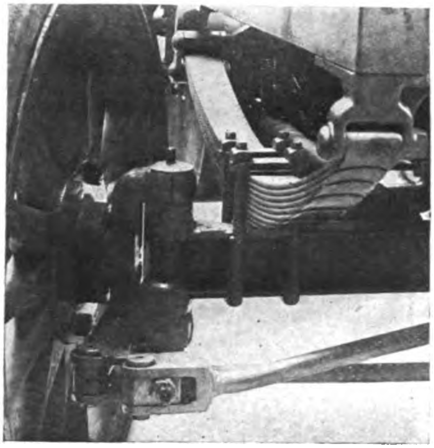


Fig. 8. Detail view of Knox Truck front axle, steering connections, spring, etc.

The Knox Municipal Motor Cars were received with instant favor, and are now in use in the following cities of the United States: Wayne, Pa.; Newburgh, N. Y.; Hartford, Conn.; Thompsonville, Conn.; Boston, Mass.; Chicopee, Mass., and Springfield, Mass.

This line of Knox Municipal Vehicles for 1909 is very greatly improved in details and is shown in much larger sizes for 1909 than before, and it may be safely said that no city can afford to use horse drawn vehicles for the purposes to which these 1909 Knox Municipal Motor Cars are adapted.

## FIVE MOTOR CARS REPLACE NINE HORSES USED BY THE SPRINGFIELD FIRE DEPARTMENT

The Springfield Fire Department, of Springfield, Mass., placed its first automobile fire engine into service 26 months ago. Now it has five machines in service, all manufactured by the Knox Auto Co. Three of the machines are rated at 40 horse power and two at 25. All are 4 cylinder gasoline machines with the motors located in front under the hood. The loads carried by the various machines differ in weight according to the purpose for which they are used, ranging from 600 to 4,000 pounds, or an average of 1,860 pounds. The machines are run over a radius of 36 square miles, and average each 2 1-5 trips per day. On an average of 38 gallons of gasoline and 2 gallons of lubricating oil are used per car per month.

The five cars now in use replaced 9 horses and 5 vehicles, consisting of hose wagons and chiefs' wagons. The vehicles cost $1,500 and $2,500, according to type. Horses cost $300 each and harness $100 per set. Cost of feeding each horse per month was $12 and the average monthly cost of shoeing each horse was $5.

The most needed improvement in motor cars suggested by their experience is the fitting of cars with self-starting devices. This department says the advantages of the motor car over the horse drawn vehicle consists of unlimited distance in travel, speed, and no horses to care for at fire.

## A PHYSICIAN'S EXPERIENCE WITH MOTOR CARS

A. D. Hard, M. D., Physician and Surgeon of Marshall, Minnesota, has used motor cars for the past 10 years, in which time he has owned seven different cars. The cars he used were mostly of the buggy type variety, costing from $400 to $1000. He usually carries two persons. Two trips are averaged daily, covering about 20 miles. Gasoline costs on an average of $3.00 per month, and lubricating oil 60 cents.

Dr. Hard formerly used 4 horses and 2 teams of single and double top buggy type. On an average 12 miles were made per day, and an average of 1½ trips. The cost of each vehicle was $90.00; horses, $175.00 each; harness, $20.00 per set; monthly cost of care and feed of each horse, $12.00; average monthly cost of shoeing each horse, $1.50, and repairs to each vehicle, $1.00. Dr. Hard suggests that cars for his profession should have four wheel drive—greater clearance—4 cylinder, 30 H. P. motor, extra soft springs—solid tires and should be air cooled. He says the motor car saves time, is more comfortable and less expensive than the horse.

## PHILADELPHIA AUTO BUS LINE IN RECEIVERS' HANDS

The Auto Transit Co., of Philadelphia, Pa., which has been operating electric auto buses on Broad street for more than a year, has been placed in the hands of a receiver. Application was made by the Electric Storage Battery Company, a creditor, and Judge Magill of Court of Common Pleas No. 1 appointed the Commercial Trust Co. and George McCurdy receivers. The cause of the failure, General Manager Peter J. Hughes admits is that the expenditures of the company exceed its receipts. The debts of the concern aggregate $80,000, while the assets, which include the Company's barn and forty-five buses, are valued at $380,000. It is said that the receivership is simply a move for reorganization and that the company has not permanently quit business.

## THE GRAMM-LOGAN CARS

The Gramm-Logan Motor Car Company, Bowling Green, Ohio, U. S. A., are manufacturing a complete line of commercial vehicles, ranging in price from $1600 to $3500. These vehicles include anything from the small four-cylinder, Model Y, 20-24 H. P. car, up to the Model X three ton truck, equipped with a 40 H. P., 4-cylinder, vertical water cooled motor under the seat at front. A Model V, 1½ ton chassis, is also marketed for $2250. This smaller car was put out in response to a wide demand for an efficient truck of medium capacity, and is in every respect a duplicate of the large Model X, with the exception of the power plant. The motor used is a 4-cylinder, vertical air cooled one, developing 20 H. P. by actual brake test. It is said this engine was given an extensive test before it was adopted, and was found to be perfectly satisfactory for the work. Either ball or roller bearings are used on all shafts, in the gear case and in the road wheels, and even in the fan bearing.

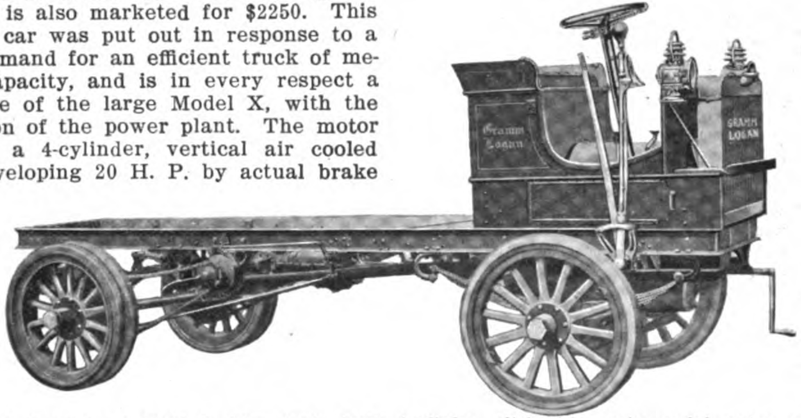


Fig. 1. Gramm-Logan Model X, 3-ton, truck chassis, 4-cylinder, 4¾-in.x5-in. water cooled motor, rated as 40 H. P., which it is claimed it actually develops on the brake. Dual ignition, self-contained oiling system, three speed and reverse sliding gear, change speed mechanism with counter shaft and drive by side chains to the rear wheels, paying load capacity three tons. Weight of chassis 5000 pounds. Wheel base, 120-in. Tread, 60-in. Price, $3500.

### MODEL X.

As the general arrangement of the cars are similar, a brief description of the Model X, 3-ton machine will give sufficient idea of the other models. Fig. 1 shows a side view of the Model X chassis. This machine has a wheel base of 120-in., and a length over all of 182 inches. The load length is 11 feet behind the driver's seat. The tread is 60-in. The car will average approximately 5000 pounds in weight, and has a carrying capacity of 3 tons pay load. The machines are geared according to requirements of the service in which they are to be used.

### THE MOTOR.

This company has experimented with electricity, steam and gasoline as motive power, and has definitely decided on gasoline. The two-cycle-four-cycle question has also been investigated by them, and a four-cylinder, four-cycle, water cooled motor decided upon. That is for the large truck, although the smaller V and Y use an air cooled motor. The Model X truck motor has twin cylinders 4¾x5-in., developing 40 H. P. on the brake. The cylinders are offset from the crank shaft 1-in. with the attendant advantages, such as more direct application to turning moment of the force of the explosion, the practical elimination of the dead center, and the reduction of side thrust on the cylinder walls. The cylinders have integral heads and water jacks and valve chambers, and are cast from reverberatory air furnace iron and not the usual cupola iron. The cylinders are accurately bored and reamed in a special machine and then ground to exact size, and tested under hydraulic pressure, both before and after machining. The pistons are of extra length and are made from the same quality of iron as the cylinders. They are also finished by grinding and carry four expansion rings with lapped joints. These rings are re-turned and ground on the sides and bearing surfaces after being cut. Five oil grooves are also turned in the side of the piston for distributing the oil from the splash, and thus lubricating the cylinder walls.

### LUBRICATION AND WATER CIRCULATION.

The lubrication is by a self-contained force feed oil system. A reservoir of about 3 gallons capacity is cast integrally with the lower part of the crank case oil pan, and the oil is pumped from this source of supply to all the bearings by means of a small gear pump, which is located in the reservoir, and driven by gears from the lower end of a vertical timer shaft. The surplus oil from the bearings passes, by means of an overflow pipe through the strainer back into the reservoir, after providing an oil level in the case for the splash. A bull's eye oil gauge at the front of the reservoir indicates the oil level. The water circulation is maintained by a centrifugal pump, gear driven. The water piping is all of seamless copper tubing. The radiator, which is mounted on the front of the frame, is assisted in its action by a belt driven fan, and has a capacity of 25 gallons.

This engine is mounted at the forward

end of the chassis on the special subframe of angle steel, the forward end of which is securely riveted to the front cross member of the main frame, which is made of 5-in. rolled channel. The rear end of the subframe rests on a cross member of angle section. This main frame is made in two pieces, bent and riveted at the center of the ends. Jump spark ignition dual type, using a magneto and dry batteries is fitted. The multiple disc clutch, which runs in oil, and is completely encased, transmits the power through a shaft fitted wih universal joints to a three speed and reverse sliding gear, which is a mechanism which is mounted with the jack shaft at about the middle of the frame. The final drive is by side chains of 1½-in. pitch, ¾-in. width to the rear wheels. The shaft connecting the clutch with the change speed gears is of chrome nickel steel and fitted with two universal joints, one being a slip joint. The change gear shafts are mounted on Timken roller bearings, the gears being of Krupp's chrome nickel steel. The standard gear ratio is 9 to 1 on the high, but can be varied to suit special conditions.

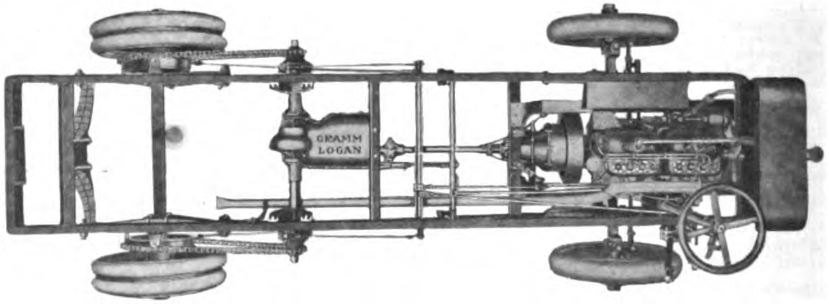


Fig. 2. Plan view of the 3-ton Gramm-Logan Model X. showing the large radiator mounted at the front. the 40 H. P. water cooled engine mounted on a special subframe. the enclosed multiple disc clutch. propeller shaft with two universal joints and slip joint. The combined change speed gear differential and counter shaft and the side chain drive. Solid tires are used at front and rear on pressed steel wheels. Front tires are 36x5-in. and 36x 3½-in. Twin tires are used on the rear. Timken roller bearings are used in the wheels and also in the steering knuckles.

There are two sets of brakes, one set of running brakes on the jack shaft, operated by foot lever and emergency brakes on the rear hubs operated by the hand lever at the right of the driver's seat. Together these brakes insure complete control, and are sufficient to hold the loaded truck on any grade. The usual spark and throttle levers are provided on the steering column just below the wheel.

The springs are semi-elliptic at the front and platform at the rear and suited to the loads carried. Heavy artillery type wheels 36-in. in diameter with felloes the entire width of the rim are used. Pressed steel is the material used in the standard wheels, wood wheels are extra. 36x5-in. solid rubber tires are used on the front wheels, and 36x3½-in. twin solid tires are fitted to the rear wheels. Steering is by worm and nut, is irreversible and is built sufficiently heavy to stand severe usage.

These trucks are also equipped with two side oil lamps and also tail lamp, and a complete set of tools. The chassis is complete in itself, and bodies may be attached or detached without interfering in any way with the mechanism of the car. Bodies of various types and excellence can be supplied to suit purchasers. All parts are claimed to be absolutely interchangeable. This large truck of 3 tons capacity sells for $3500 without body.

### THE MODEL Y.

The motor of both Model V and Model Y is a 20 H. P., 4-cylinder, air cooled one, which it is claimed remains cooled under any and all conditions, and is also very quiet. The cylinders are cast separately with integral flanges, and the valves are of the overhead type, operated by vertical rods and rocker arms. The crank case is made of special aluminum alloy with internal ribs giving maximum strength and minimum weight. Crank shafts are drop forgings of special steel, hardened and ground to size and are also carefully balanced. The bearings are Parson's white brass and carefully hand scraped. Four eccentric rings with diagonal cuts are used on the pistons. These rings are finished by grinding after being cut. The timer is mounted on a vertical shaft and is driven by means of mitre gears from the cam shaft. A large fan is mounted at the front of the engine on a support from the crank case, and is so arranged that the fan belt tension is adjustable. This Model Y has a solid rear axle, is side chain driven and is fitted with 34-in. wheels. The chassis sells for $1600, and the 1½-ton sells for $2250. This model uses the same air cooled motor as the $1600 car.

A special point is made by the company of the fact that the bodies are in no way connected with the mechanism, and that any and all conditions, and is also very to suit varying conditions, also that a single chassis is frequently used in connection with several bodies. All machines are sold F. O. B., Bowling Green, Ohio,

## THREE MOTOR CARS REPLACE SIX HORSES AND VEHICLES

The Indianapolis Water Company, of Indianapolis, Ind., has replaced its horse drawn equipment with motor cars, which so far have proven very successful. This concern uses the cars in its street department, reading meters and turning water on and off.

The company purchased three 9 H. P. Cadillac gasoline cars at $850 each, the motors of which are of the horizontal type and are set under the body. These cars carry an average weight of 1650 pounds each. From 30 to 45 miles are covered per day by each car. An average of 4 trips and 20 calls per trip are made daily. The three cars together cover an average of 120 square miles. The average monthly cost of gasoline per car is $6, lubricating oil $1.50, and repair work and repair parts $4. This concern does its own storing.

Six horses and six buggies were used before the motor cars were put in service. The first cost and running expenses of the horse-drawn equipment are briefly summarized, as follows: Average weight of load, 650 pounds; average daily mileage, 20; two trips, 15 to 25 calls per trip daily; cost of each vehicle, $90.00; cost of horse, $125.00; cost of harness, $20.00; average monthly cost of feed for each horse, $15.00; shoeing each horse, $1.50, and repairs per month to each vehicle, $1.00. By comparing the total running expenses of the motor car equipment with those of the horse equipment, it will be seen that the former effects a saving of $70.50 per month, and at the same time allows of more mileage.

### COMMERCIAL NOTES

The Auto Livery Co. has recently been formed in Birmingham, Ala., for the purpose of doing a delivery and transfer business.

The Auto Express Company, of Detroit, Mich., has been formed for the purpose of operating a taxicab service in that city. Twenty vehicles are to be installed at the start.

The Autocar Company of Ardmore, Pa., recently added a 20 H. P. power motor station bus, seating nine passengers. The interior of the car is finely upholstered, ventilated and heated.

N. P. Collins, of Olean, N. Y., is operating a motor bus line between the depot and local hotels. A fare of 10 cents is charged.

A motor truck is in service between Greenwood and Indianapolis, Ind., a distance of twelve miles, hauling milk. One company expects to have nine cars in service eventually.

The automobile freight line running between Croville and Brewster, in Okanogan county, Washington, is claimed to be the longest line of its kind in this country. The distance is 80 miles. Formerly the line was served by ordinary wagons, which took days for the trip while the motor vehicles make the trip in eight hours.

An automobile route has been established between Crystal Park and Manitou, Col., by the Crystal Park Co., which was recently incorporated with a capital stock of $780,000.

Most of the large plumbing, pipe and tool supply dealers in Indianapolis, Ind., are using automobile trucks, the Indiana Supply Company having just purchased a 30 H. P. truck to look after its Indianapolis work.

A motor bus service is being operated between Lake View, Oregon, and Likely, California.

A taxicab service will probably be established in Lafayette, Ind.

The London Improved Cab Co., London, Eng., has decided to place 750 motor cabs on the streets of the metropolis, and to eventually supplant all its horse drawn cabs with motor vehicles.

The Manhattan Auto Co., of New York, has sent one of its sightseeing cars to Jackson, Fla., for the winter, where it is to make four daily round trips for the accommodation of sightseers.

An appropriation of $2500 has been made by the Board of Health of Newark, N. J., for the purchase of a motor ambulance for the City Hospital.

Oshkosh, Wis., is to have an automobile for its fire department soon.

Rhodes Brothers, owners of the bus line running between Paoli and New Albany, Indiana, are about to install a motor bus. The change will allow them to make the trip three times daily instead of three time a week, as formerly.

A company is to be organized in San Diego, Cal., for the purpose of placing taxicabs on the city streets.

A motor driven police wagon has recently been placed in service in the city of Tacoma, Wash.

The fire department of Thompsonville, Conn., has been supplied with a motor hose and chemical wagon.

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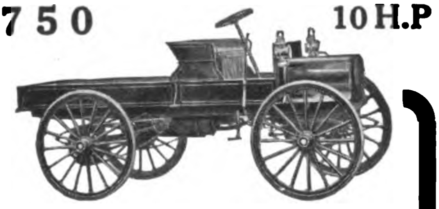
Swinehart Clincher Tire & Rubber Co., Akron, Ohio, report the duplication of orders for the solid-cushion tires by The Seagrave Co. for use on motor propelled fire apparatus. Several sets have been in use on Seagrave fire apparatus during the past year and two sets have just been ordered for fire wagons which are to be used in the Vancouver (B. C.) fire department. As fire wagons must be run at high speed over all kinds of road surfaces, the continued use of Swinehart solid-cushion tires by The Seagrave Co., which suggest that these tires are entirely satisfactory for high-speed work.

F. C. Lindoerfer has recently resigned his position in the sales department of the Oscar Lear Automobile Co., and has taken a position as sales and advertising manager of the Autocar Equipment Co., of Buffalo, N. Y.

$750 10H.P



**Chase Motor Wagon**

**Capacity 500 to 1000 lbs. Two cylinder, two cycle, air-cooled, 10 H. P. Motor.**

***Write for Catalog***

**Chase Motor Truck Co., Syracuse, N. Y.**

# The Rapid Agency Proposition

**12-Passenger Pullman**

For the profitable business of sight-seeing, hotel work, summer and winter resort work, etc.

USE SWIFT FALLS FLOUR

**1-Ton Open Job**

For all kinds of carting purposes.

SUBURBAN DELIVERY

**1-Ton Panel Job**

Suitable for dry goods, and general delivery work.

**The 5-Ton Truck**

Built in 3, 4, 5 and 6-ton sizes suitable for flour mills, coal companies and any line of business requiring a heavy-duty power wagon.

We want agents—hustling business getters—men with financial backing—not chauffeurs or demonstrators—and to the one in each locality who secures the agency for **Rapid Commercial Power Wagons**, we will put behind him one of the greatest selling and advertising campaigns ever put behind any commercial power wagon proposition.

More money, more new plans, more legitimate aids will be given the agent for

## Rapid Commercial Power Wagons

than ever before.

Write today for our agency proposition.

**The Rapid Line for 1909** comprises models ranging from 1,000 pounds up to six tons, as follows: **Rapid Commercial Power Wagons for any line of business in ½, 1, 1½, 2, 3, 4, 5 and 6-ton sizes.**

Motive power: engines of the two cylinder opposed 24 to 30-H. P. type, up to four cylinders, 60-H. P., vertical, heavy duty motors.

The **Rapid** line for 1909 offers the largest selection of models ever manufactured.

We have spent **over a quarter-million dollars** to bring **Rapid Commercial Power Wagons** up to their present state of perfection and efficiency.

A word about the **Rapid Motor Vehicle Company:** It is the largest and oldest in the commercial car business—and makes nothing but Rapid Commercial Power Wagons, which are **"BUILT FOR BUSINESS."**

The agent who "ties up" to our organization gets backing which means a great deal, not only in influence, but in protection and fair treatment; a factory which can stand back of its product with a guarantee that means just what it says and a factory which helps its agents in every way possible.

Just to remind you—write today.

See us at the New York, Boston and Chicago Shows.

## RAPID MOTOR VEHICLE COMPANY

**509 Rapid Street, Pontiac, Michigan, U. S. A.**

Members American Motor Car Manufacturers Association.

# "AMERICAN TRUCKS"

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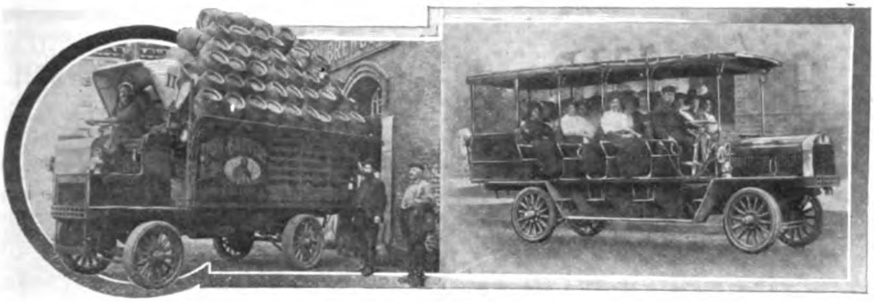
No pioneering for **YOU** to do **WE** have done it



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DELIVERY WAGONS, TRUCKS, OMNIBUSES, STAGES, SIGHT-SEEING CARS, AMBULANCES and PATROL WAGONS

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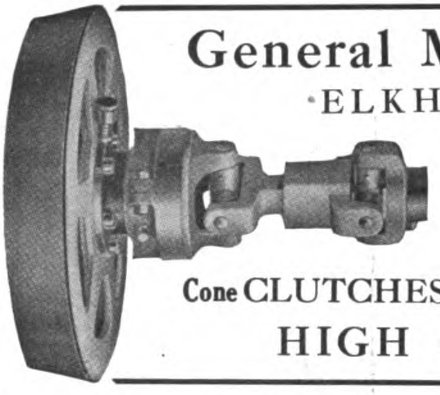

## General Manufacturing Co.

ELKHART, INDIANA

## Parts Makers

Cone CLUTCHES, TRANSMISSIONS 20 to 50 H.P.

HIGH GRADE WORK

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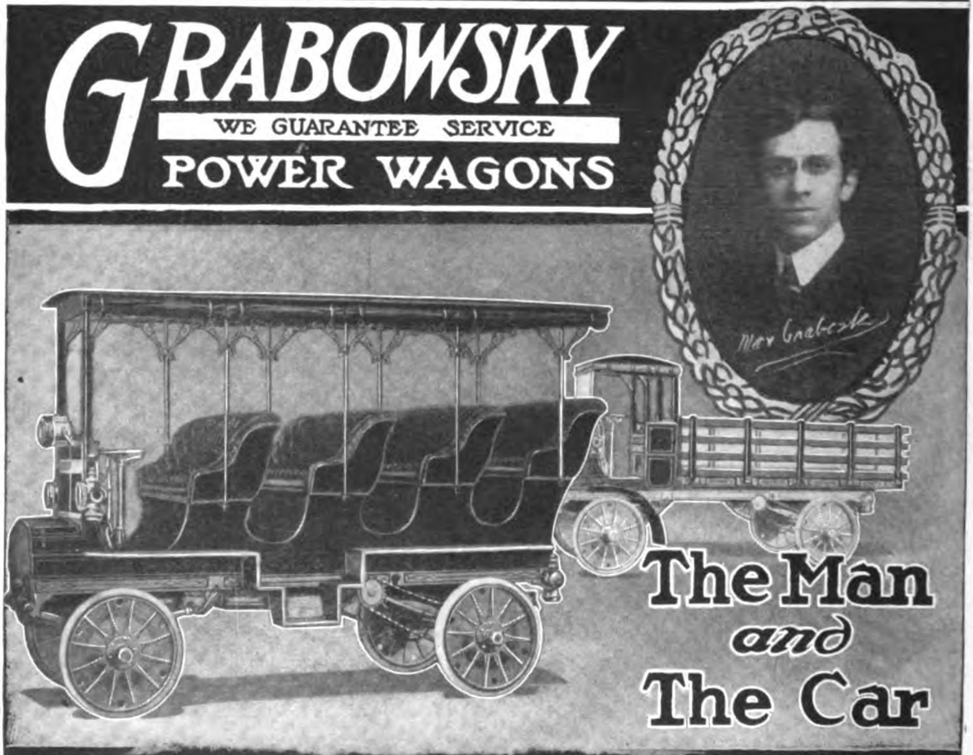
POWER WAGONS



## The First Car in the World Built on the Quick Detachable Independent Unit Basis, Which Insures Uninterrupted Service and Low Cost of Maintenance

The latest production of Max Grabowsky, the pioneer commercial car designer of America. There are more cars of Max Grabowsky's design in actual service than any other type of commercial car in the country.

### TO THE BUSINESS MAN

We have organized an Expert Service Bureau, and will gladly advise any business man, without charge, regarding the actual saving he can make by using power wagons, either for delivery or passenger work. Valuable experience is at your disposal. WRITE TO-DAY, OUTLINING YOUR NEEDS.

**GRABOWSKY POWER WAGON CO. SERVICE BUREAU**

80 CHAMPLAIN STREET Standard Manufacturers, A. M. C. M. A. DETROIT, MICHIGAN

We will Exhibit in New York, only at Grand Central Palace Auto Show, opening Dec. 31st.

# GRAMM-LOGAN COMMERCIAL CARS

## The "Great Trio" in Business Wagons

### Model "X" · Three-Ton Truck Chassis

A masterpiece of design and construction. Equipped with a 45 H. P. Motor, built to carry with ease the load for which it is rated. Will give consistent service year in and year out. Price, $3,500

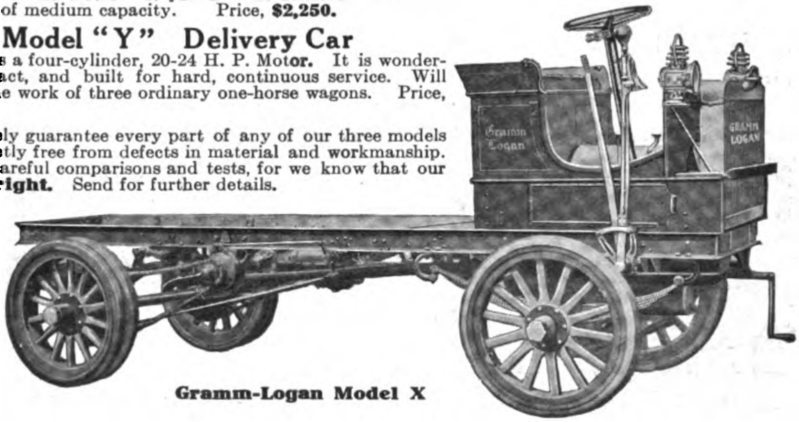
### Model "V" One and One-half-Ton Truck Chassis

A duplicate in miniature of the famous Model "X" Three-Ton Truck. It has a 25 H. P., four-cylinder, vertical, air-cooled motor. It just fills the demand for an efficient truck of medium capacity. Price, $2,250.

### Model "Y" Delivery Car

This car has a four-cylinder, 20-24 H. P. Motor. It is wonderfully compact, and built for hard, continuous service. Will easily do the work of three ordinary one-horse wagons. Price, $1,600.

We positively guarantee every part of any of our three models to be perfectly free from defects in material and workmanship. We invite careful comparisons and tests, for we know that our trucks are **right**. Send for further details.



Gramm-Logan Model X

**THE GRAMM-LOGAN MOTOR CAR CO., Bowling Green, Ohio**

Will exhibit at Grand Central Palace, N. Y., December 31st to January 7th, 1909.

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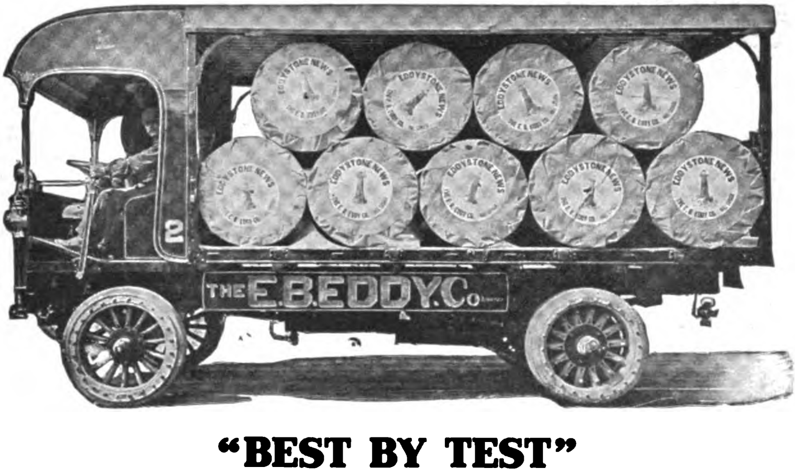
# 5 TON HEWITT TRUCK



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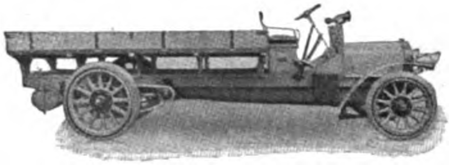
**3-TON—2-TON—LIGHT DELIVERY—ALL SATISFIED**

**HEWITT MOTOR CO., 10 E. 31st St., New York City**

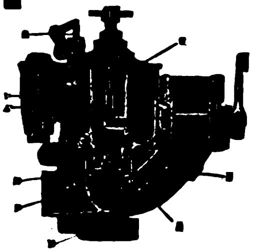
# SAURER MOTOR TRUCKS



THE COMMERCIAL MOTORCAR CO.

TIMES BUILDING, 42ND STREET AND BROADWAY, NEW YORK, N. Y.

# Palmbla 'Syphon' Carburetor

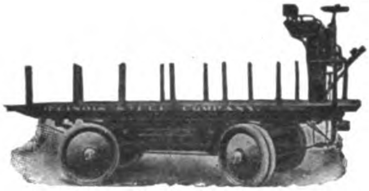


**1909 MODEL**

**FLEXIBLE CHOKE TUBE and ONE AIR INTAKE creates complete vaporization at all motor speeds. We are ready to prove our claims.**

**THE NORTH CHICAGO MACHINE CO.**

**NORTH CHICAGO - - - - - - ILLINOIS**



**DON'T** Purchase a Horseless Wagon until you have seen the "**Couple-Gear.**"

4-wheel drive and steer. 4 sizes. Battery or Gas Electric type. Send for catalogue. Agents wanted. Address

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**Parsons' Manganese Bronze Axles**

Stronger than steel.
Thousands in use.
None have ever broken.

The Wm. Cramp & Sons Ship and Engine Building Company
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100 MANUFACTURERS
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**INDESTRUCTIBLE STEEL WHEELS**
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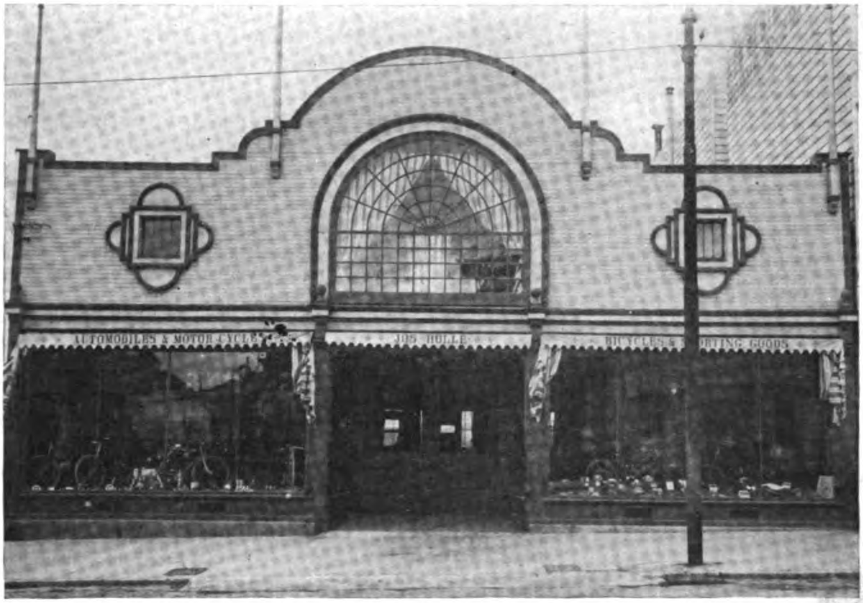
# Van Motor Wagons

Our output sold for several months ahead. Orders accepted for delivery in 4 months only.

**H. F. VAN WAMBEKE & SONS**
Elgin, Illinois

# MOTOR CYCLE DEPARTMENT



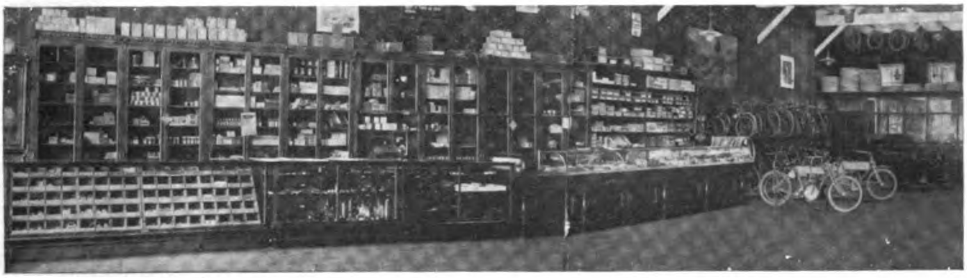
Panoramic view of one side of the salesroom of Jos. Holle. Truss roof construction gives a 50-ft wide room without obstructing posts.

## THE HOLLE MOTOR CYCLE ESTABLISHMENT

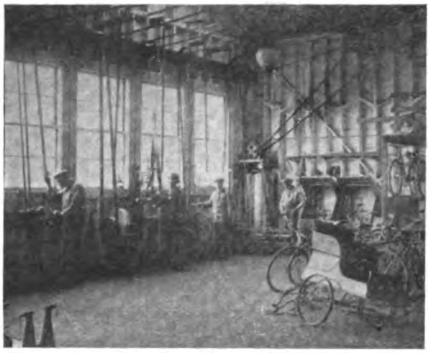
What is claimed to be the largest retail motor cycle establishment in the country is owned and conducted by Joseph Holle and is located at 20th and Folsom Streets, San Francisco, Cal. This well planned, well equipped building has a 50 foot front and a depth of 122½ feet giving a total floor space on one floor of 6,125 square feet. The front portion of the building is allotted to the salesroom and the truss roof construction employed gives an absolutely clear floor as no supporting posts are necessary.

The repair shop is 50x35 feet and is equipped for all kinds of repairs.

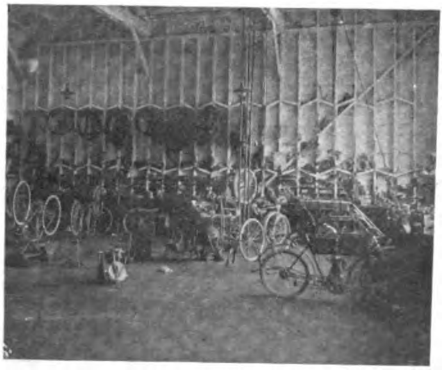
Joseph Holle, more widely known in his vicinity as "Joe Holley the Bike Doctor," is a pioneer in the motor cycle field. He received his first machine—a Holley Autobike—in November, 1900. This ma-



Facade of the Holle motor cycle establishment claimed to be the largest in the country. Building is 50 x 122½ ft., giving 6125 sq. ft. of floor space.



A corner of the Holle repair shop. The drills, lathe and other machines are along the left wall and the air-compresser may be seen in the corner.



Another corner of the Holley repair shop. The repair shop is 50 x 35 feet.

chine was made by Holley Brothers the well-known carburetor and magneto manufacturers. He has been engaged in the bicycle business in San Francisco nearly 14 years.

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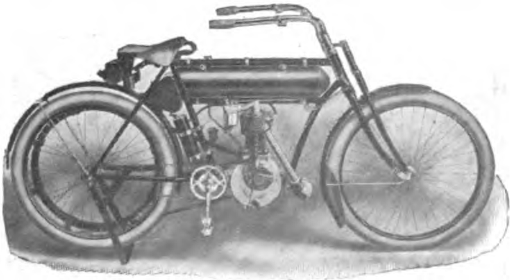
## THE "YALE" 3½ H. P. MOTORCYCLE

For the season of 1909 the Consolidated Mfg. Co., of Toledo, Ohio, is offering the Yale 3½ H. P. motorcycle shown herewith. All features of this machine are along lines of the best foreign practice, which, together with the unsurpassed manufacturing facilities of this company, have been utilized to produce a reliable, consistently performing motorcycle at a reasonable price.



The "Yale" 3½ H. P. 1909 Motorcycle; Price $200.

The motor is of the 4-cycle type; bore, 3 5-32 in. by 3 11-16 in. stroke; enclosed fly wheels weighing 31 pounds. All bearings are forged from tool-steel, hardened and ground, running in best bronze bearing metal. The valves are forged from nickel steel. An I-beam connecting rod is fitted. The cylinder piston and rings are of die cast metal. A glass oil sight feed is fitted in right side of the crank case.

Ignition is by jump spark, from dry cells. The vibrator is attached to the side of the gear case on main bearing. The contact points are iridium platinum. The battery box holds three No. 6 dry cells. The spark coil is attached to the seat mast.

A simple and economical float feed carburetor is fitted. The control is by double grip. The right grip operates the throttle and the left grip the spark and exhaust valve lift. Transmission is by a 1¾ in. special tanned, waterproof belt; the proper tension being maintained by moving the rear wheel back with chain adjusting screws and patent belt fastener. The gasoline tank holds 1½ gallons of gasoline and two quarts of lubricating oil. The oil tank is carried in a separate apartment in the gasoline tank. Oil is forced in the crank case by a pump. The frame is 1⅛ in. 16 gauge seamless tube, with extra brace. All connections made from drop forgings are strongly reinforced and the rear fork ends forged. Turned head fittings are carefully hardened. The wheel base is 53¼ in. The cushion fork absorbs all vibration from front wheel; has large springs and tension adjusted to suit rider. Three inch, strongly braced mud guards are fitted. The tires are of the Clincher type, 28x2½ ins., Morgan & Wright. A Troxel Eagle motor seat is fitted. Morrow coaster brake. The machine is finished Royal blue with an option on red. The price of the machine is $200 F. O. B., Toledo, Ohio. This price includes complete set of tools in roll, and a motorcycle stand. The weight of the machine is 160 pounds.

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## N. S. U. 1909 PRODUCT

The N. S. U. line of motor cycles for the 1909 season is the most complete the N. S. U. Motor Co., 206 W. 76th Street, New York City, has ever produced. There are all sizes from 1½ H. P. light weight machines to 7 H. P. twin cylinders both pleasure and racing models. The complete line of machines made by this concern will be described in the February issue of this "Journal."

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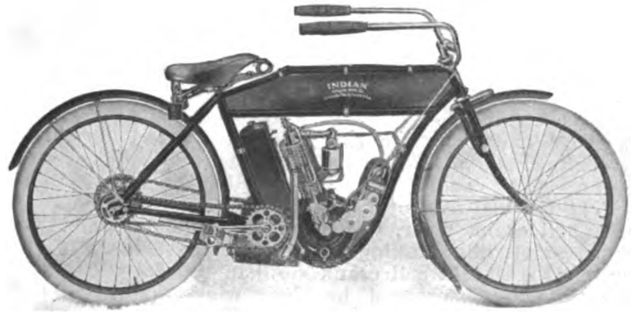
Robert Stubbs, of Birmingham, Ala., recently broke the American track record for motor cycles for 100 miles in 2: 5: 5 4-5, and the world's record of 2: 2: 19, when he covered the 100 laps of the Birmingham fair ground track in 1 hr. 47 mins. and 44 secs.

## HENDEE MFG. CO. PREPARED TO GIVE PUBLIC WHAT IT WANTS

Recognizing the sway of fashion and determined to meet every demand of the public, Hendee Mfg. Co., of Springfield, Mass., have prepared for 1909 a line of "Indian" motor cycles including both belt and chain-driven models with both diamond and loop frames. They do not recede an inch from their beliefs as to what is best from an engineering standpoint and they will recommend the use of chain drive and diamond frame. The line includes a 2¾ and a 5 horse-power model each with chain drive and diamond frames only, and 2¾, 3½, 4, 5 and 7 horse-power loop from models to be furnished with either chain or belt drive, excepting the 2¾ H. P. model which for the present will be furnished with chain drive only. The 2¾ diamond frame, chain drive model is listed at $175, the 5 H. P., chain drive model at $225. The list prices of the loop frame models are respectively $200, $225, $275, $275 and $325, the last three being furnished only with magneto ignition while the 2¾ and 3½ horse-power models may be had with either battery or magneto ignition, the latter of course at additional cost.



The new single cylinder loop frame Indian. Furnished with battery or Magneto ignition.

The new loop frame model is expected to meet with popular approval. Besides a most symmetrical and pleasing outline, this model gives the low rear seat position, so much in favor at present, with the low, forward engine position. This frame is constructed of reinforced tubing, the reinforcement consisting of a continuous mid rib of steel plate rolled into the tube during its manufacture; and in forming the frame this reinforcing plate is kept in line with its longitudinal plane, stiffening and strengthening it in the direction of the severest shocks and strains. The frame is also built with double top tubes, which not only greatly increases its strength but produces an absolutely rigid head, features greatly to be desired on account of the excessive speed at which riders are now driving their machines.

An important feature of the new model is the increased tank capacity, for both oil and gasolene. The gasolene tank contains a little over two gallons, and is conveniently located between the two upper tubes of the frame. Built into it is a most substantial cut-off valve, this company's experience having satisfied them that a perfectly satisfactory outside valve cannot be constructed. The oil tank is also new, and contains about two quarts. It is located on the rear bracket that secures the motor to the frame, in about the same position as in previous Indian models, but of greater capacity and securely fastened to the bracket and to the seat post.

An oil reservoir has also been introduced into the motor base. It will hold a sufficient quantity of oil to insure a thoroughly efficient splash system for the lubrication of the inner mechanism of the motor. As an adjunct to this reservoir a little window, covered with a heavy glass, is formed in the side of the motor base, enabling the operator at all times to directly inspect the condition of his lubrication.

In the motor itself there will be no radical changes, but it retains all of the peculiar and special features which have made it notable in the past. In details, however, there are many variations from previous construction. In all of the new models the spark plug will be placed in the middle of the head, and in the twins the valve mechanism has been wholly remodeled, making it simpler, stronger and more efficient, while at the same time it is practically impossible to get out of adjustment. The valve lifting device is also entirely new, direct acting and certain in operation. In the single-cylinder machines the valve mechanism remains the same as heretofore, the present form having proved most satisfactory.

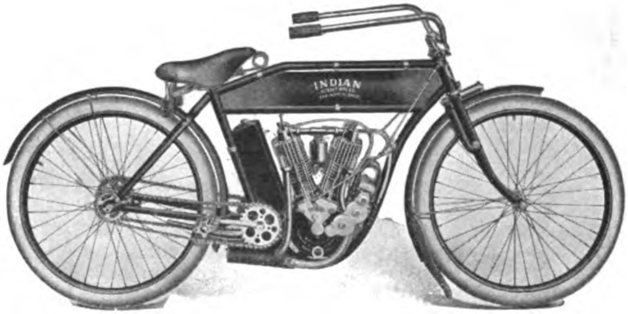
The Indians will, as heretofore, be supplied in royal blue and Indian red, with the additional choice of Indian green, the french gray having been abandoned as undesirable.

The new loop frame design has been very thoroughly tried out during the past season in a number of racing machines that have been put into all of the most strenuous events of the year.

The new frame is a trifle longer than in previous models, making the wheel base 53 inches long, the extra length making for steadiness in running, besides adding considerably to the ease and gracefulness of the lines of the design. This added length, together with the rear saddle position, necessitates longer handle bars.

A most valuable feature of the 1909 Indian will be a new and powerful band coaster brake, built especially for this machine. This is an exclusive Indian feature. The idea of combining the accepted value of the band brake with the indispensable coaster feature is novel.

The most noticeable feature of the 1909 Hedstrom motor, which is used on the Indian machine, is the new mechanical valve action in which simplicity is a leading characteristic. Two cams are used in the twin, as usual, but one cam operates the inlet valves exclusively, while the other cam operates both of the exhaust valves. This arrangement has the advantage that simpler cams can be used, resulting in more regular and even action, and their operation is also practically inaudible at the highest speeds. The cams are also wider than ever before, which lessens the liability of wear, and contributes to smooth action. The exhaust cam operates on one arm of a bell crank lever, which carries a hardened steel roller, taking up all wear on the cam; and this bell crank operates a lifting finger, interposed between it and the valve lift rod. If there is any wear in the mechanism it must come on the lever or finger, which are quickly replaced at a trifling cost. The exhaust valve lift rods are provided with hardened steel adjusting screws, which entirely obviate all of the old difficulties of securing proper adjustment at this point.


The New Indian Loop Frame, 2-cylinder motor cycle. Furnished with Magneto Ignition only and with chain or belt drive.

The inlet valves are operated from their special cam through a light lift rod and a little rocking lever pivoted on the dome. The action is said to be positive, regular, smooth and quiet.

The new exhaust valve lifting mechanism is equally efficient. A steel disc having cams formed on its two opposite edges, and a toothed sector on its upper edge, is pivoted by a hardened steel bushing on the projecting end of the bronze cam shaft bearing. A short shaft passing through the cam case, and having a bearing in both the cover and body of the case, carries a crank lever at its outer end and a pinion at its inner end. This pinion meshes with the toothed sector on the valve lifting disc, and the lever connects with the usual valve release rod from the grip control. On operating this lever the pinion revolves the disc, causing the cams on its opposite edges to act on the bell crank levers, before mentioned, thus lifting the exhaust valves by a direct, positive and certain action which is both powerful and smooth in operation. The inlet is placed over the exhaust and in the same pocket so that the cold vapor entering the chamber tends to keep the exhaust valve cool.

One point in particular in the design of the mechanism contained in the cam case is worthy of special consideration, and that is every shaft, pin or stud, carrying the operating mechanism, has a bearing at both ends, one in the case itself and the other in the substantial cover, an arrangement that entirely overcomes the possibility of any part twisting or working loose. In all of the new models the valves have been increased in size, this improvement being suggested by the successful experience with the 3½, 4 and 7 H. P. models of 1908, which latter sizes retain the same sizes of valves for 1909. All of the valve gears in the 1909 models are wider than heretofore, greatly increasing their strength and wearing qualities. The bearings have also been increased in size.

The enlargement of the valves, with the accompanying increase in size of both inlet and exhaust pipes, has materially affected the operation of the motor, giving an increase in power, with a smoothness of operation never before attained. With the increase in size of the valves, corresponding changes have been made in the carbureter, but these in no way affect the principles, operation nor its efficiency. The location of the spark plug in the center of the cylinder head, a change made possible by the new location of the motor, will be approved of by many. A minor change, but contributing to the appearance of the motor, is the stripping of the cooling ribs from the lower third of the cylinders, which is believed will meet with popular approval.

A very notable change has been made in the design of the motor base used in the 1909 machines which greatly improves the lubrication of the motor. In the lowest part of the base an oil pocket is formed, which contains an ample surplus of oil, and into these reservoirs the fly wheels dip sufficiently to continually pick up a fresh supply of oil, which is thrown forcibly upon every moving part by the rapid revolution of the fly wheel. With the very considerable quantity of oil which this reservoir accommodates not only is the lubrication more thorough than ever before, but the oil is maintained in better condition than was possible in the close fitting bases hitherto universally used. And to enable the rider at all times to ascertain the quantity and condition of his oil supply, instead of a gauge, that is liable to clog or leak, a window, protected by heavy glass, is placed in the base in such a position that direct observation may be made of the state of affairs in the reservoir.

The great feature of the 1909 machine is its accessibility. Every part, except the fly wheel group, can be reached directly without removing the motor from the frame, or doing any unnecessary dismantling; and if it is desired to remove the motor, this can be done readily. A dome can be removed at once; a cylinder-head, or the cylinder itself, is cleared in a few minutes. The exhaust pipes and magneto gears are clear of everything, and of each other, while the cam case can be dismembered in two minutes.

The attachment of the magneto is especially good, for it rests upon one of the brackets that connect the motor with the frame, thus becoming practically an integral part of the motor, and this is desirable in order to secure the smoothest operation of the train of driving gears. The location also renders every part of the magneto readily accessible, without the necessity of removing the magneto bodily for inspection or adjustment.

The oil tank occupies a similar position to the magneto, but at the rear of the cylinders, where there is sufficient room to securely locate a receptacle that contains fully two quarts, a supply sufficient for at least 400 miles.

Another feature of the tank is a new filling cap which will not shake off even if it does become unscrewed by the vibration of the machine.

The muffler for the new model has been entirely redesigned. The exhaust pipes are larger than heretofore, giving a very free relief to the spent gases, and in the twin both pipes are led directly, without any sharp turns, to the little muffler, and from there, after expansion and reduction of pressure, the gases pass off through a long vent pipe that extends far back and just below the rear fork side, discharging at a point where they can offer no inconvenience to the rider.

On the drive side of the machine a new chain and gear guard covers all moving parts, amply protecting them from mud and injury, and also protecting the rider from contact with these fast moving parts, and from flying oil.

In the belt-drive machine the counter shaft, with its compensating sprocket, is entirely omitted, and a V shaped pulley is substituted for the small sprocket on the engine shaft. A similar large pulley is built into the rear wheel, and on these the belt runs, giving a direct drive of the latest accepted type.

In the single-cylinder models the mechanical valves have the same operative mechanism as in the 1908 models, this having proved efficient and satisfactory in every respect. Otherwise these models are very similar in details to the twins, above described. The cylinder is inclined toward the rear, corresponding in angle with the seat post, in this respect resembling previous models.

In these models arranged for battery ignition the batteries are placed in a case that rests upon the forward bracket connecting the motor with the frame, in the same position that the magneto would be.

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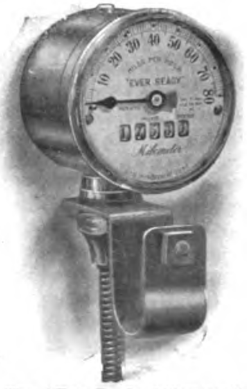
## NEW "EVER-READY" MOTORCYCLE SPEEDOMETER

Auto Improvement Co., 301-322 Hudson Street, New York City, are including in their line of 1909 "Ever-Ready" speedometers one called the "Milometer," for motorcycle use, which is here illustrated. This instrument lists at $15 with flexible shaft and handlebar attachments. Both the instrument and its fittings are nickel plated. The speed index registers up to 80 miles per hour and is suitable for machines of any power. This instrument contains the "Ever-Ready" direct drive odometer registering up to 10,000 miles and automatically re-setting to 0.



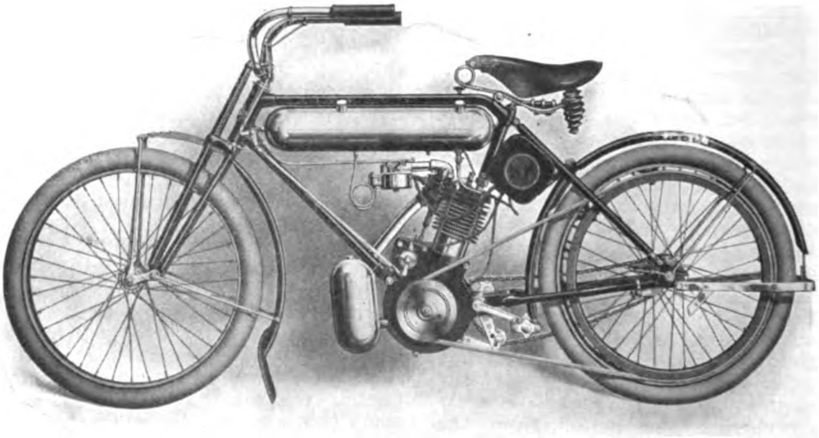
The "Ever-Ready Milometer."

The Ever-Ready "Cycle-Meter," a 60-mile instrument, suitable for pedal or motorcycles lists at $12, or $15 with maximum hand. It registers up to 60 miles per hour. The dial is 2 in. in diameter. It is silvered and the figures are in black.

## "M. M." MOTORCYCLES FOR 1909

The American Motor Company of Brockton, Mass., makers of the well known M. M. motorcycles, is to market for the season of 1909 five distinct models.

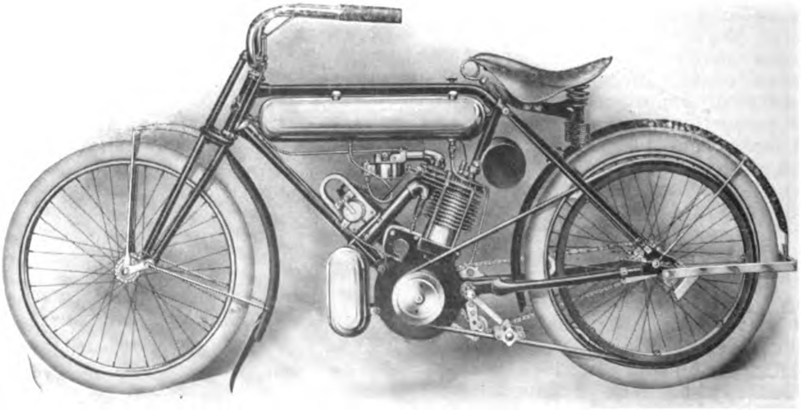
This company's lowest priced model sells for $175 and is known as the M. M. 3 H. P. Roadster. It is finished in black, with nickel trimmings. This machine has the standard three batteries and coil form of ignition, and many 1909 improvements such as wide mud guards; a special constructed frame dropped at the seat post joint admitting of a more perfect saddle position; a 53-inch base; 26-inch wheels; equipped with 2¼-inch clincher tires;



The "M. M." $200. 3½ H. P. Battery Special Model.

with 28 inch wheels, equipped with 2¼-inch Goodrich, Morgan & Wright, or G & J clincher tires; Messinger Cavalry seat; newly designed M. M. carburetor, giving the greatest possible range of speed on one adjustment, and also the M. M. silent muffler which so effectually muffles the engine, it is said, that the rider cannot hear the exhaust escape while riding.

Messinger No. 3 Cavalry seat; the newly designed carburetor giving the best possible results under all conditions whether travelling five or fifty-five miles per hour; the M. M. silent muffler; a new engine construction which is so constructed as to admit of a perfect balance thereby delivering more real power and speed without vibration, a low center of gravity; wide



The "M. M." $225, 3½ H. P Magneto Special Model.

ing. These, together with many other improvements mentioned more fully in the descriptions of the other models, are features of the 1909 construction.

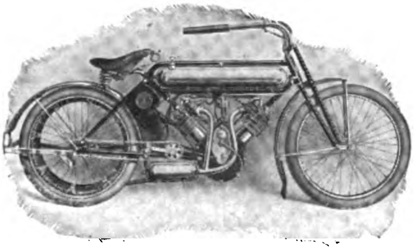
The $200 M. M. 3½ H. P. Battery Special, shown herewith, is finished in red

flat, thick mineral tanned belt transmission, or "V" belt if desired.

It is also provided with the M. M. patent Motorcycle stand attached to rear of the frame and fastened to rear end of mud guard when not in use. Has ingenious device on fuel tank indirect contact with cupped pet cock in cylinder head for priming purposes during cold weather for easy starting, an improved double grip control.

The leader of the M. M. line is the 3½ H. P. Magneto Special, selling at $225 and illustrated herewith.

In addition to all of the improvements mentioned on the other models, this magneto Special is equipped with Bosch high tension magneto, thus doing away with all batteries and coil. It is also equipped with a special built tool box of metal, leather lined, of cylindrical shape, attached to frame in rear in same position as the battery box on the other models. This tool box is of sufficient capacity to carry a set of complete motorcycle tools. This model also has a greatly improved rear frame construction which admits of easily removing the cylinder head without taking machine to pieces. It also has a detachable rear mud guard to admit of easily repairing the rear tire. This model can be had with either a flat or "V" type of belt.



The "M. M." $250, 6 H. P. Twin Battery Model.

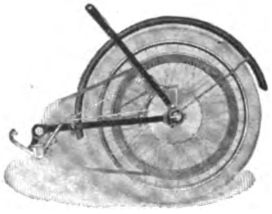
In the line of twin cylinder models this concern is offering the 6 H. P. Battery Twin, selling at $250 and the 7 H. P. Magneto Twin selling at $285. The 6 H. P. machine is fitted with four standard batteries and a double combination coil. This machine, in addition to all of the 1909 improvements, has a great many new features exclusively its own. Most particularly the 90 degree angle of its cylinders, which is claimed by the manufacturers to be the only possible angle for perfectly balancing a Twin Cylinder engine. The engine is said to cool much more freely at this angle because of more cooling service in and around the cylinders. It is said these 6 H. P. Twins can attain a speed of from five to sixty-five miles per hour. The transmission on this model is an extra heavy special made 3-ply, 1¾ inches wide endless Barnes mineral tanned belt or a "V" belt if desired.

The 7 H. P. magneto Twin, like the magneto Special, is equipped with Bosch high tension magneto eliminating all batteries and coil, and lists at $285. It has the same general construction as the $250 battery Twin, only has more horse-power and a special magneto, which requires a trifle different construction.

## THE "K. & R." TWO-SPEED AND FREE ENGINE DEVICE

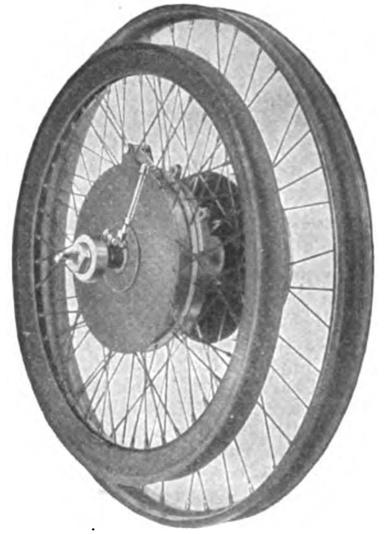
Keller & Risque, American National Bank Building, St. Paul, Minn., are manufacturers of the "K. & R." two-speed and free engine device for motorcycles, shown herewith.

The method of starting a motorcycle fitted with the "K. & R." device is unique. The foot levers are set on free engine position (always in this position when machine is stopped), the exhaust valve raised to release compression, and the crank given one turn and the motor is started. The crank slips onto an automatic "back off catch" on the right hand side of the live back axle.



The "K. & R." Conversion set complete as furnished for any make of motorcycle.

No foot pedals are necessary with this device but instead a foot or running board which is covered with rubber matting is provided. This board is on a slant so that the rider can change position of the feet while riding.



Complete rear wheel of the "K & R." Two-Speed and Free Engine Device.

The foot levers for operating the "K. & R." are in convenient positions—one lever for high gear—one for low gear and one for the band brake; the free engine being obtained when neither high or low gear friction bands are in use. These friction bands also act as friction clutches, making it possible to start as smoothly and as steady as with an automobile, on either high or low gear. There are no hand levers—all operated with the feet leaving hands free for use on the bars.

By a convenient little foot catch, either high or low gear can be locked in stationary position where change of gear is not required for some length of time—thus relieving the rider of holding his foot on the lever and the slightest foot pressure will release the catch instantly, giving free engine.

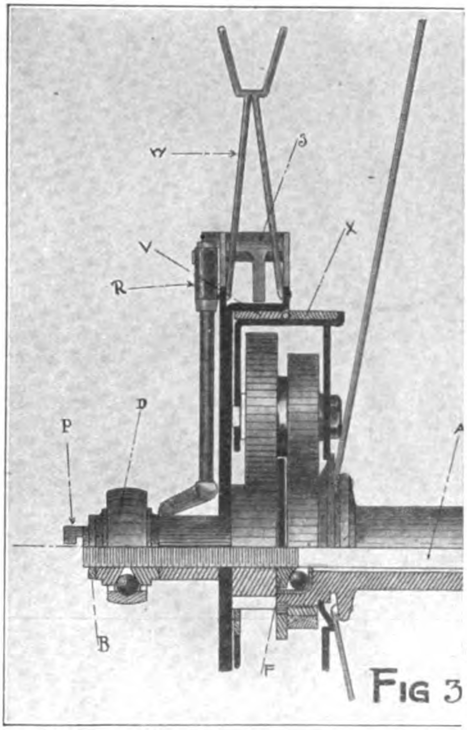


FIG 3

Cross Section of the "K. & R." Two-Speed and Free Engine Device.

In the cross section of the device, "A" indicates the live back axle which is fitted with ball bearings at either end, adjustable cones for adjustment of bearings are locked in place by lock nuts "B." The outer cone of bearings "D" are locked in the special fork ends. The second set of ball bearings will be noticed as being adjusted by adjustable cone "F" which gives the live axle and the rear wheel hub each an independent set of bearings. The heavy shaded portions show a cross section of the gear box, inside of which are the gears. "V" represents the friction band for high gear which is put into operation by foot lever that pushes in on "P" and by means of cantilever and "R," tightens this band, locking all gears and giving direct transmission. By tightening the friction band "X" by means of another foot lever, the gear box is held in a stationary position and through the reduction of gears, gives low gear—when both of these friction bands are released, the pulley rim, gear box and gears all run free, giving free engine. Thus it will be seen that on either high or low gear there is no friction—all gears being locked in stationary position.

The cut showing the complete rear wheel also shows the outside ball bearings and the mechanism for operating the high and low gears and the friction clutch for starting. The road wheel is built up for any make of tire and for any type of belt. This two-speed device is furnished in what is known as the Conversion Set which can be fitted to any make of motorcycle. This set includes the entire rear driving wheel with two speed and free-engine device, rear forks, rear stays, foot levers for operating high and low gear, friction clutch, free-engine, band brake—everything except tire which can be transferred from old wheel.

## THE "RELIANCE" MOTOR CYCLE BATTERY

The Storage Battery Supply Co., 239 E. 27th Street, New York City, manufactures the Reliance motor cycle battery shown herewith in celluloid as well as rubber jars.

The manufacturers claim the celluloid makes an exceedingly tough battery jar and the fact that it can be hermetically sealed makes this an ideal form. The jars are made from polished sheet celluloid and are reinforced at all joints. The plates are suspended and separated by projections on the sides of the jar, leaving a clear view beneath and between them. The cells are connected together with nickel-plated brass connections and binding posts. The cells are put up in sets of from 1 to 4, and list at $4.50 for the 1 cell, 2 volt, 10 amp. hr. capacity, and at $18.00 for the 4 cell set, 3 volt, 10 amp. hr. capacity. The cells fitted with rubber jars list from $3.00 to $12.00.

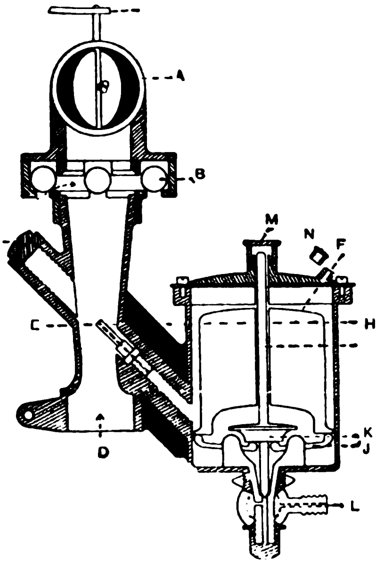
The "Reliance" Motor Cycle Battery.

The Badger Brass Mfg. Co. has recently purchased the old Meiselbach bicycle factory which adjoins their own plant in Kenosha, Wis., in order to relieve the crowding in the Badger works, and to take care of the growth of Solar lamp business for some time to come.

## THE "G. & A." MOTOR CYCLE CARBURETOR

George V. Lyons Motor Co., Broadway near 87th Street, New York City, importers of the Minerva motor cycles, is now also importing the "G. & A." carburetor for motor cycles. The sectional illustration herewith gives a clear idea of its constructional lines and shows that it is designed for simplicity and accessibility.

A novel feature of this carburetor is the device employed for controlling the extra air required at high speeds. The mixture chamber above the jet carries a perforated collar, known as the auxiliary air chamber, the air holes in which are of various dimensions and are covered by metal balls of corresponding sizes. When the motor is running slowly the lightest ball only will be lifted from its seating, admitting but a small quantity of air. As the speed of the motor increases other balls be lifted until the motor is running at its maximum speed, thus always providing the correct amount of air in proportion to the speed of the motor. There are no spring valves or other devices to get out of adjustment.

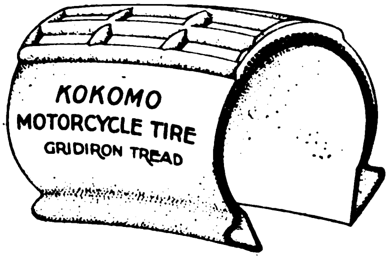


Sectional view "G. & A." carburetor for motorcycles. A, butterfly throttle; B, balls controlling extra air inlet; C, nut covering jet; D, primary air aperture; E, jet; F, float; G, needle valve; H, gasoline level; J, levers; K, weight attached to needle valve; L, gasoline inlet. M, cap closing needle valve; N, cap closing cover of float chamber.

The orifice of the jet is placed at the narrowest part of a conical chamber placed vertically beside the float chamber. Hot air is carried in at the bottom through a funnel-shaped tube carried from the cylinder walls, and thus acquires a very high velocity as it rushes through the narrow portion past the jet, carrying the gasoline with it to the ball controlled mixing chamber above. The jet projects at an upward angle from the float chamber, and can be removed without disturbing the carburetor in any way. The throttle is placed above the mixture chamber, and is of the butterfly type.

## THE "KOKOMO" MOTORCYCLE TIRE

The Kokomo Rubber Co., of Kokomo, Ind., well known as manufacturers of vehicle and bicycle tires, has lately placed on the market a motorcycle tire. This tire is moulded in regular moulds of the same pattern as are used in moulding automobile tires. A closely woven fabric is used which is especially adapted for retaining the rubber. The tire is made in single Clincher type as shown.

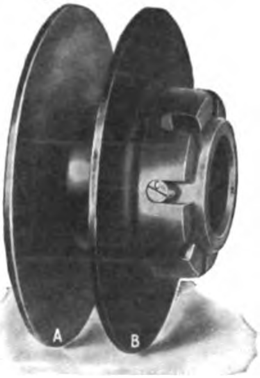


The "Kokomo" Motorcycle Tire.

## THE "WALTON" ADJUSTABLE MOTORCYCLE PULLEY

The Walton Motor Co., Inc., Lynbrook, Long Island, New York, has recently placed on the market the adjustable motorcycle pulley illustrated herewith.

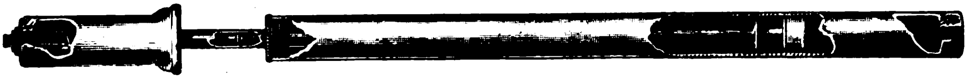
This pulley gives eight adjustments and needs no tools to alter the gear ratio, this being done by running the belt off, pressing the flange B back, and turning it around until slot of greater or lesser depth is opposite the peg C in the sleeve of the flange A. The belt keeps the peg up in the slot, thus varying the effective diameter of the pulley. This pulley is made to suit any belt driven machine. The list price is $5.



The "Walton" Adjustable Motorcycle Pulley.

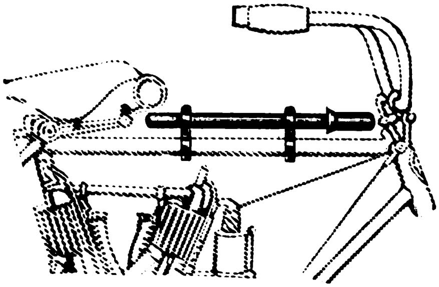
## THE "BRIDGEPORT" NO. 20 TELESCOPE MOTORCYCLE TIRE PUMP

The Bridgeport motorcycle tire pump illustrated herewith is the product of the Bridgeport Brass Co., Broadway and Murray Streets, New York City.



The "Bridgeport" No. 20 Telescope Motorcycle Tire pump.

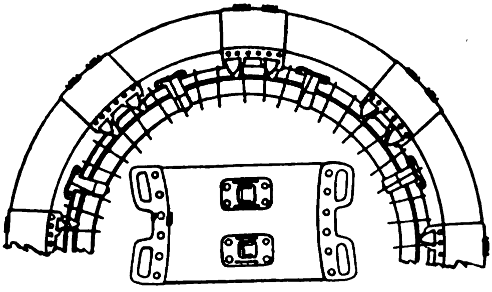
The cylinder of the pump is made of heavy seamless brass tubing, including the inner plunger tube. The handle and nipple ends are reinforced and the whole affair is heavily nickel plated. The hose connections are made to fit either American or Foreign valve sizes. The pump can be attached to the frame of the machine by means of two adjustable clips.



Showing how the "Bridgeport" No. 20 Telescope Motorcycle Tire Pump can be attached to the frame of a motorcycle.

## THE "N. S. U." DETACHABLE NON-SKID BANDS

The accompanying cut illustrates the N. S. U. Detachable Non-Skid Band, manufactured by the N. S. U. Motor Co., of 206 West 76th Street, New York City.



Details of the "N. S. U." Detachable Non-Skid Band.

The outfit consists of eight pairs of hooks fastened at regular intervals to the rear wheel of a motor cycle thus becoming a permanent fixture. For each pair of hooks a leather band about 3½ in. wide is provided, which is easily placed in position if the tire is slightly deflated, then when the tire is pumped hard again it is securely held in place and will not slip or chaff the rim. The bands are provided in the center with square metal plates having rectangular projections which grip into slippery surfaces. The result is that safety on greasy or muddy roads is assured while the danger of slipping on block or stone pavement is minimized owing to the large amount of rubber surface exposed.

These non-skids need only be used in cases of emergency and are very practical for that exact reason, as they are quickly removed, and, moreover, do not interfere to any extent with the resiliency of the tire or detract from the power of the engine thus not placing an extra burden on the chain or belt as the case may be. Provided the rims and clearance space will admit it, the non-skid device can be attached to any machine and when not in use, can be detached and stowed away. A special bag or carrier is provided for those who might care to have one. The bands and studs can be replaced separately when worn.

## THE N. S. U. "EASY STARTING PLUG"

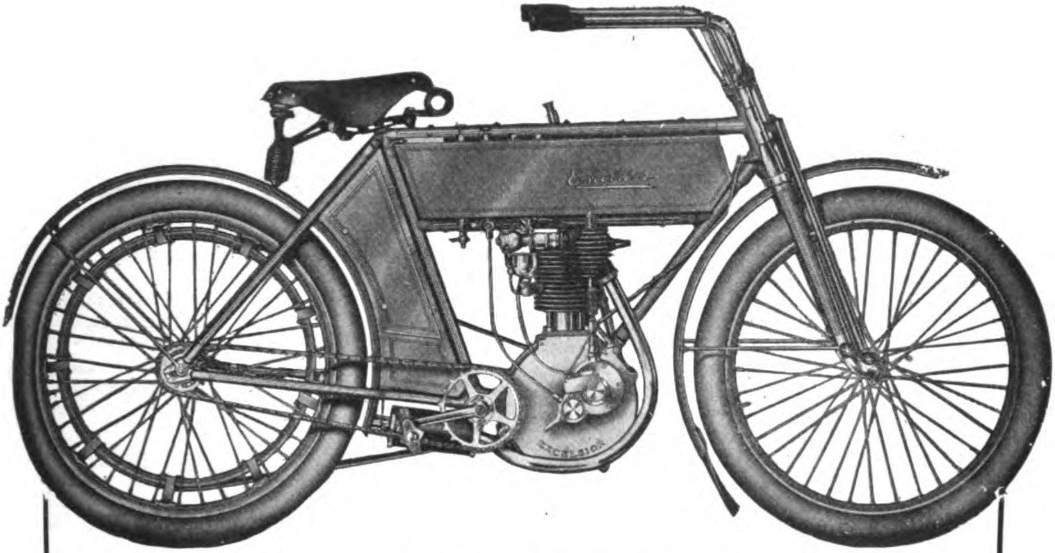
The N. S. U. Motor Co., of 206 West 76th Street, New York City, has lately placed on the market a spark plug, which is claimed to prevent all ignition troubles resulting from improper spark plug construction and to make starting easy. The plug is made in two styles, mica insulation with ⅛ inch nut and metric thread. Three points sparking to a platinum wound steel wire form the ignition arcs.

## WIDMAYER INCORPORATES

The Frank B. Widmayer Company, of 2312 Broadway, New York City, has been incorporated under the New York State Laws with a capital stock of $10,000. The company will manufacture, sell, store and repair motorcycles, bicycles, automobiles and electrical and mechanical devices of all kinds. Its officers are F. B. Widmayer, President and Treasurer; W. F. Widmayer, Jr., Vice-President, and H. C. Mapp, Secretary.

A new motorcycle club has recently been organized in Chicago. Through the efforts of Manager Fisher, of the local Indian branch, the riders of machines of that make have been organized under the name "Indian Motorcycle Club of Chicago." On Sunday, November 8, they held their first run.

At Sydney, Australia, a month ago, several local motorcycle agents and riders inaugurated a reliability and endurance contest in which a large number of motorcycle enthusiasts took part. The distance was 100 miles, but so many completed the distance with perfect scores that it was decided to keep on running till a winner was produced. After going over the course 5 or 6 more times a 5 H. P. twin cylinder N. S. U. won the contest.



# MOTOR CYCLE DEALERS

Do you know that EXCELSIOR DEALERS are Prosperous Dealers and that satisfied owners have made them so?

## EXCELSIOR AUTO-CYCLES

have been tried in every kind of real practical service and have **made good** every time.

Our 1909 Line and 1909 Propositions will be the best ever offered and will be backed by the experience, resources and business integrity of a company of thirty-two years' standing.

## EXCELSIOR AUTO-CYCLES

will be sold by established dealers only, no curbstone brokers or pocket agents, and at a fixed and invariable price.

If you mean business, so do we.

Let's get together.

---

EXCELSIOR SUPPLY COMPANY
233-237 Randolph Street - - CHICAGO, ILL.
ESTABLISHED 1876

# Answers to Motor Cycle Questions by the Technical Committee, New York Motorcycle Club

**(We desire not only our readers to make full use of this department, but any one who disagrees with the opinions herein expressed.)**

### BUILDING 2-CYCLE MOTORCYCLE ENGINE

Like others, I am building a 2-cycle, 2-cylinder motorcycle engine. Have purchased such castings as were suitable for my purpose from a concern who advertised in your columns, but will have to build a crank and crank case. Would like to know if plain bearings would be applicable for a 2-cylinder machine, or if it would not tend to blow the oil out of bearings and spoil its lubricating qualities, or whether it would be necessary to use some form of stuffing box, which would be rather difficult in case I have the crank, as I would like to have it, in one piece. Would it be possible to use Hess-Bright or other annular ball bearings? I intend to mount the engine lengthwise in the frame, with enclosed mitre gears and pulley for a V belt to rear wheel, as I believe, especially at reduced speeds, this to be the easiest and best transmission. Would like to put a 2-speed device on engine and enclose it in crank case if possible, to be operated either by foot lever, hand lever, or both, as may be convenient at the moment. Can you kindly give me the names of firms who make or sell such devices? Your inquiries and answers are very instructing, as is the rest of the magazine, and such parts of it as are of value to me I remove and bind in a loose leaf binder to refer to later.

May the good work continue.

NEW YORK CITY. H. T. P.

Plain bearings are used on small two-cycle engines without any stuffing-box whatever, and can be used in this way on a motorcycle engine, but will necessitate long bearings, which will make a wide crank case. If the engine is of the three-port type there will be very little oil forced out the ends, as the partial vacuum produced in the crank case before the port opens tends to suck the oil back in the case, and to a certain extent neutralizes the tendency of the compression in the case on the down stroke, to force the oil out. Hess-Bright annular ball bearings are used on some motorcycle engines of the four-cycle type, and doubtless can be used on a two-cycle engine, but some form of stuffing-box would necessarily have to be devised. However, as the use of these bearings would make a very narrow crank case possible, the additional width of the stuffing-boxes need not necessarily bring the total width of the case greater than it would be if plain bearings were used.

The Hess-Bright Mfg. Co., 2102 Fairmount Ave., Phila., will be pleased to make you a suggestion in regard to the use of their bearings under these conditions, if you will send a sketch showing the general arrangement of your engine, crank shaft and crank case, giving of course the principal dimensions.

In regard to two-speed devices, will give you the names of the following companies: Keller & Risque, St. Paul, Minnneapolis; Bushnell & Cannon, 1268 E. 80th Place, Cleveland, O., and the N. S. U. Motor Co., 206 W. 76th St., N. Y. City.—Ed.

### WATER-PROOF LEATHER BELT SATISFACTORY

The following is sent us by a San Francisco reader in regard to using a belt:

Have recently put on a flat, single-ply, heavy water-proof leather belt, same as regular stock belt from a belt supply house.

Have made 185 miles with it over hills and hollows, in and around San Francisco, and so far have not put on idler, nor been obliged to shorten belt. My gear now is 3.7 to 1. Shall let you know further as to results when idler is put on.

SAN FRANCISCO, CAL. C. J. DAHL.

### A 2-CYCLE MOTORCYCLE

[164.] Seeing an inquiry by Chas. M. Seavey about 2-cycle motorcycles would like to state that there is a 2-cycle motorcycle made in Oakland, Cal. The address I do not know but from what I have seen of them it is one of the prettiest running machines I have yet seen. It is called the Duck Motorcycle. These machines I believe use a carburetor. E. J. GAERTNER.

The Duck Motorcycle Co. was in Oakland, Cal. We have heard nothing of them for some time, however.—Ed.

Motorcycles will soon be sold by the mail order houses. A prominent western concern has already contracted for a large number of machines which will bear its name plate.

The Danville Motorcycle Club, of Danville, Ill., is drawing up plans for a monster hill climb next May. It has a double reverse curve in it, and is 1,600 feet long. Every manufacturer and importer in the United States will be asked to send machines and riders for the different classes.

The motorcycle has been increasing its popularity steadily of late years, but it is only recently that the manufacturers of this type of vehicle have organized. They will act concertedly in the future and the first complete exhibition of motorcycles under their auspices will be given at the licensed show in Madison Square Garden, January 16-23.

For **1909** The

**INDIAN**

**MOTOCYCLE**

WILL MEET EVERY DEMAND IN PRICES, MODELS, POWERS

2 MODELS. 7 DIFFERENT MACHINES

**CHAIN OR BELT DRIVE**

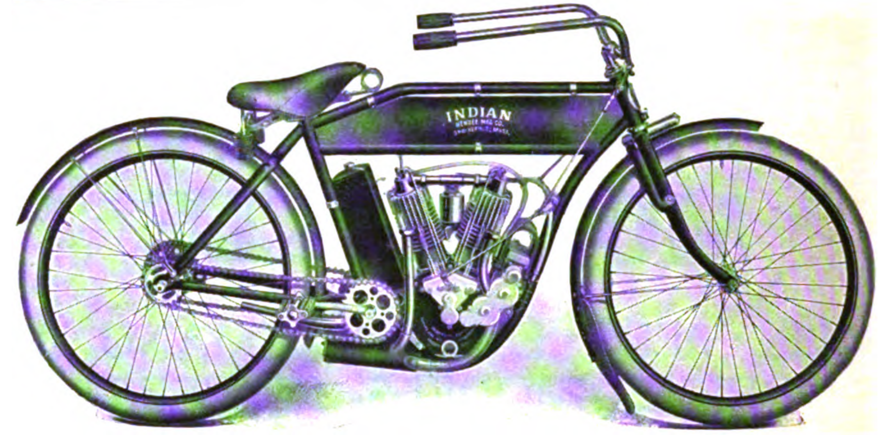
THE NEW MODELS are Handsomer, Better, Faster Than Any Ever Shown Before

LIBERAL TERMS TO SALES AGENTS Who are Loyally Protected

There will be more money in motocycles than in automobiles for those who get in early and right. The machine that advertises itself is the best advertised and the easiest to sell. The INDIAN has LED EVERYTHING for 7 years. GET THE LEADER.

**Hendee Manufacturing Co.**
**Springfield, Mass.**

# The Indian Holds All Records for Speed, Endurance, Reliability, Hill Climbing



**1909 TWIN, 38.61 (5 H. P.)**

## SPECIFICATIONS FOR 38.61 (5 H. P.) LOOP FRAME TWIN

MOTOR: Hedstrom improved, air cooled. Stroke, 3¼; bore, 2¾ inches.

VALVES: Mechanically operated by new mechanism. New exhaust valve.

CARBURETOR: Hedstrom improved, automatic, compensating, specially remodeled.

CONTROL: **Indian** patent leverless, double grip, "twist-of-the-wrist" system. Right grip controls spark advance and exhaust valve release; left grip controls throttle.

MUFFLER: **Indian** latest improved. Smallest and most efficient ever produced. Fitted with cut-out operated by foot, giving complete release.

SPEED: Five to sixty miles an hour. Variations according to gear used.

FRAME: Special steel tubing REINFORCED THROUGHOUT ITS LENGTH. Height, 19 inches.

WHEEL BASE: Fifty-three inches, contributing to steadiness at all speeds.

FORKS: **Indian** patented, double spring, convertible cushion forks. Seamless tubing, thoroughly reinforced. Fork crown and hinges, drop forgings.

WHEELS: Twenty-eight inches; 36 spokes front and rear.

RIMS: Hollow steel, finished to match frame.

GUARDS: Improved wide mud guards front and rear. Front guard provided with splasher.

TIRES: G. & J. improved, moulded, 2½ inch detachable.

IGNITION: High tension magneto.

SPARK PLUGS: Hedstrom perfection mica plugs.

TRANSMISSION: **Indian** patent roller chain drive, with compensating sprocket. Chains and sprockets efficiently protected by guard. Option, direct V belt drive.

BRAKE: Corbin **Indian** SPECIAL COASTER BAND BRAKE.

SADDLE: Imported Brooks B-100-5 motocycle saddle, with compound springs. Options, B-100-4, B-90-4.

TANKS: Gasolene capacity, over two gallons. Improved sure tight gasolene cut-off built into tank. Oil capacity, two quarts.

OIL GAUGE: Direct sight, opening to improved oil reservoir in base.

FINISH: Royal **Indian** blue; all bright parts nickeled on copper. Options, **Indian** red or **Indian** green.

WEIGHT: One hundred and fifty-five pounds.

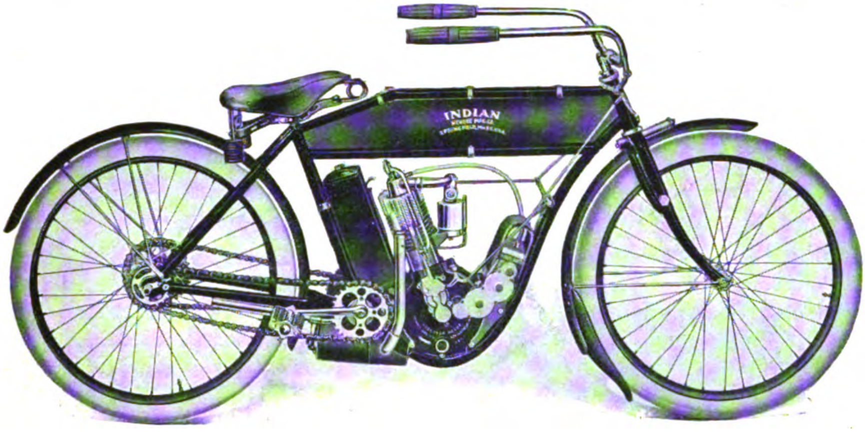
TOOL BAG: **Indian** improved square bag, containing all necessary tools, oil can and repair outfit.

For prices, see succeeding page.

**Hendee Manufacturing Co., Springfield, Mass.**

# The Indian Holds Every F. A. M. Championship

## Won the Great New York–Chicago Long Distance Touring Contest



**1909 SINGLE 19.30$^3$ (2¾ H. P.)**
**Showing Characteristics of all Single-Cylinder Models**

### SPECIFICATIONS FOR 1909 LOOP FRAME SINGLE-CYLINDER INDIAN 19.30$^3$ (2¾ H. P.), and 26.96$^3$ (3½ H. P.)

MOTORS: Hedstrom, improved, air cooled. 19.30$^3$, Stroke, 3¼; bore, 2¾ inches. 26.96$^3$, Stroke, 3¼; bore, 3¼ inches.

VALVES: Mechanically operated.

CARBURETOR: Hedstrom, improved, automatic, compensating carburetor.

CONTROL: **Indian** patented leverless, double grip, "twist-of-the-wrist" system. Right grip controls electrical spark and exhaust valve release; left grip controls throttle.

MUFFLER: **Indian** latest improved. Smallest and most efficient ever produced. Absolutely noiseless. Fitted with cut-out operated by foot, giving complete release.

FRAME: New improved loop model. Special steel tubing REINFORCED THROUGHOUT ITS LENGTH. Height, 19 inches.

FORKS: **Indian** patented, double spring, convertible cushion forks. Seamless tubing, thoroughly reinforced. Fork crown and hinges, drop forgings.

WHEELS: Twenty-eight inches, 36 spokes both front and rear.

RIMS: Hollow steel, finished to match frame.

GUARDS: Improved wide mud guards front and rear. Front guard provided with splasher.

WHEEL BASE: Fifty-three inches, contributing to steadiness at all speeds.

TIRES: G. & J. improved, moulded, 2½ inch detachable.

IGNITION: No. 6 dry batteries. Option, special magneto, $25.00 extra.

SPARK PLUG: Hedstrom mica plug.

TRANSMISSION: **Indian** roller chain drive, with compensating sprocket. Chains and sprockets efficiently protected by guard. Option, direct V belt drive. (The 2¾ H. P. machine will be supplied with chain drive only.)

BRAKE: Corbin **Indian** SPECIAL COASTER BAND BRAKE.

SADDLE: Imported Brooks B-100-5 motocycle saddle, with compound springs. Options, B-100-4, B-90-4.

TANKS: Gasolene capacity, over two gallons. Improved sure tight gasolene cut-off built into tank. Oil capacity, two quarts.

OIL GAUGE: Direct sight, opening to improved oil reservoir in base.

FINISH: Royal **Indian** blue; all bright parts nickeled on copper. Options, **Indian** red or **Indian** green.

WEIGHT: One hundred and fifty-five pounds.

TOOL BAG: **Indian** improved reinforced square bag, containing necessary tools, oil can and repair outfit.

For prices, see succeeding page.

**Hendee Manufacturing Co., Springfield, Mass.**

# Attractive Features

## For Both Sales Agent and Buyer

## PRICES

### 1909 Loop Frame Models

| | |
|---|---|
| 19.30' (2¾ H. P.) Single-cylinder, Battery Ignition | $200.00 |
| With magneto | 225.00 |
| 26.96' (3½ H. P.) Single-cylinder, Battery Ignition | 225.00 |
| With magneto | 250.00 |
| 30.16' (4 H. P.) Single-cylinder, magneto only | 275.00 |
| 38.61' (5 H. P.) Twin, magneto only | 275.00 |
| 60.32' (7 H. P.) Twin, magneto only | 325.00 |

**Chain or Belt Drive Except the 2¾ H. P. which will be Built in Chain Drive Only**

### 1909 Diamond Frame Models

**Chain Drive Only; Battery Ignition Only**

| | |
|---|---|
| 19.30' (2¾ H. P.) diamond frame | $175.00 |
| 38.61' (5 H. P.) twin diamond frame | 225.00 |

Auxiliary tank and rear seat position extra.

## We are Sole Agents for

# BROOKS' CELEBRATED SADDLES

## For Bicycles and Motocycles

**Best in the World**

# HENDEE MANUFACTURING CO.

**Springfield, Mass.**

*Thor*

# IF YOU WANT A LOOK IN

THE

**Motorcycle**

**SUPREME**

IS the
KEY that
Unlocks the
Door TO

**SUCCESS**

For the Motorcycle
Dealer or Rider

Ask for Catalog 9
It Tells the Story

**AURORA AUTOMATIC
MACHINERY COMPANY**
AURORA, ILL.

## Chilton Daylight Color Process

# POST CARDS

are unequaled for advertising purposes

Send for samples and prices

**CHILTON PRINTING COMPANY**
Market and 49th Streets, Philadelphia

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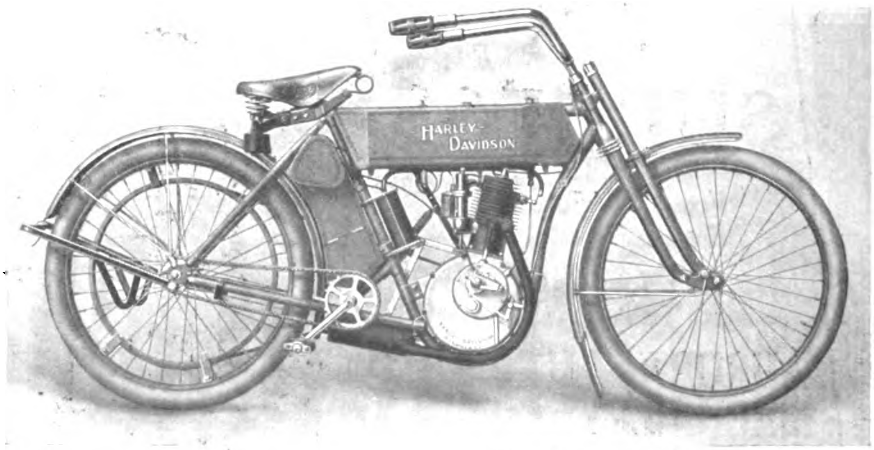
## THE DIAMOND MEDAL MACHINE

**Holder of the World's Economy Record**



**The Real 1909 Sensation—4 H. P.—$210**

Double bar-frame, positive double grip control, attached stand, and a host of other good points. Send for Catalog "E."

**HARLEY-DAVIDSON MOTOR COMPANY - - Milwaukee, Wisconsin**

# 1909 MESINGER MOTORCYCLE SADDLES

fitted with **Shock Absorbers** which **check** the **rebound,** prevent **sideplay** and **breakage** and is absolutely noiseless.

Mesinger
Cavalry No 3

**"Cavalry" No. 3**
Patent applied for.
Made in five sizes
**Cavalry Type**
**Suspension Type "Standard"**
Made in four sizes.

Mesinger Cavalry No. 3 has the proper shape for a Motorcycle Saddle; made like a horseback saddle, to hold the rider in his original comfortable position.

Complete catalogue of Saddles, etc., on application

Mesinger Saddles cost no more than the ordinary kinds. Specify them when you order your new mount.

**No motorcyclist** will ride another saddle after he has tried a Mesinger 1909 fitted with Shock Absorbers.

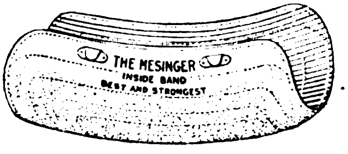
## The Mesinger Tire Repair Bands

### Inside Tire Band

**Guaranteed to wear satisfactory** to the consumer, are standard articles and sold by all jobbers and dealers of Automobile Accessories.

Our Inside Tire Repair Band is made of India Rubber strong fabric, has beveled edges and is moulded to fit the inside of Clincher, Dunlop or Fisk Tires. The hooks can be bent to fit the different styles of casings to prevent creeping.

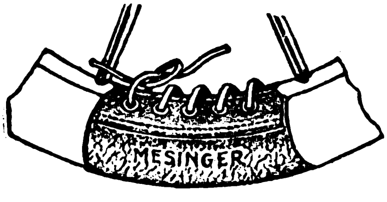
This thoroughly tested Repair Band is made exactly on the same principle as the inside of a Regular Tire, and repairs **blowouts, rimcuts** and other defects of the casing.



| Size | Price |
|---|---|
| 2 & 2½ inches | $1.60 |
| 3 & 3½ " | 2.00 |
| 4 & 4½ " | 2.50 |
| 5 & 5½ " | 3.00 |

### Outside Tire Repair Band

This tire band is made of **Mineral Chrome** tanned leather, which wears like rubber, is tough, soft and pliable; water does not affect it.



| Size | Price |
|---|---|
| 2½ inches | $ .85 |
| 3 " | 1.00 |
| 3½ " | 1.20 |
| 4 " | 1.40 |
| 4½ " | 1.60 |
| 5 " | 1.80 |

Ready to attach to the tire.

**Sold by all Jobbers and Dealers**

**We Will Exhibit at Madison Square Garden, Space 549, Motorcycle Section**

**We Warn the Trade and Consumers Against the Use of Raw Hide Tire Bands. They Burn and Ruin the Tread of the Tire**

## H. & F. MESINGER MFG. COMPANY

**Manufacturers of**

**Automobile Leather Specialties, Bicycle and Motorcycle Saddles**

**1801 & 1803 FIRST AVENUE, NEW YORK CITY**

# SPECIAL

## MERKEL-LIGHT

## 2 KINDS

## MERKEL BELT DRIVE

After many years in Milwaukee, Wis., as manufacturers of the Merkel Motorcycles, we entered into a combination with the makers of the Light Motorcycles at Pottstown, Pa., for the purpose of increasing quality and decreasing the cost of production, in order to place upon the market the finest line of motorcycles in America.

We are now established in a new, modern, five story brick building at Pottstown, Pa. Our new factory is equipped with the latest and best types of machinery and tools to facilitate the production of the highest type of motorcycles at the lowest possible prices, in order to meet the demands of the trade.

## FOR 1909

### 3 Belt-Driven Models

3½-H. P., Single Cylinder, Battery Ignition.

3½-H. P., Single Cylinder, with gear-driven ball-bearing magneto.

7-H. P., Double Cylinder, with gear-driven ball-bearing magneto.

All furnished with the renowned and only CUSHION FRAME as applied to motorcycles, now in its sixth successful year. Ask anyone who has ever ridden one.

Reconstructed—perfect flexibility.

All furnished with a new and original design SPRING FORK that is TRUSSED and will insure safety, rigidity—and Comfort.

TRANSMISSION. V-Belts.

OILING. Mechanical force feed lubricator; window in the crank case to see the level of oil

Band Brake with free Rear Wheel. Meet us at the New York, Chicago & Boston Shows.

**MERKEL-LIGHT MOTOR CO.**

# ANNOUNCEMENT

## MOTOR COMPANY

## 1 QUALITY

## LIGHT CHAIN DRIVE

With our increased facilities and a large variety of machine tools, including Grinding Machines, we are in position to manufacture the best belt and chain Motorcycles.

The factory will be under the supervision of Mr. J. F. Merkel, who is recognized as the foremost designer in America.

For 1909 the MERKEL-LIGHT will be the most complete and best selling line and it will place dealers in a position to successfully meet all competition. It will be easier to sell MERKEL & LIGHT MOTORCYCLES than to sell against them.

## FOR 1909

### 3 Chain-Driven Models

2¾-H. P, Single Cylinder, Battery Ignition.

3½-H. P., Single Cylinder, Battery Ignition.

7-H. P., Double Cylinder, gear-driven ball-bearing magneto ignition.

The equipment of these chain-driven models is the very highest that can BE PRODUCED. It embodies all the successful, latest ideas of engineering skill

Motors are mounted in the loop tube constructed frames, with double top bars.

Spring forks and double grip control on all models and will be furnished with 26" or 28" wheels.

Black or Ruben's red finish at purchasers' option.

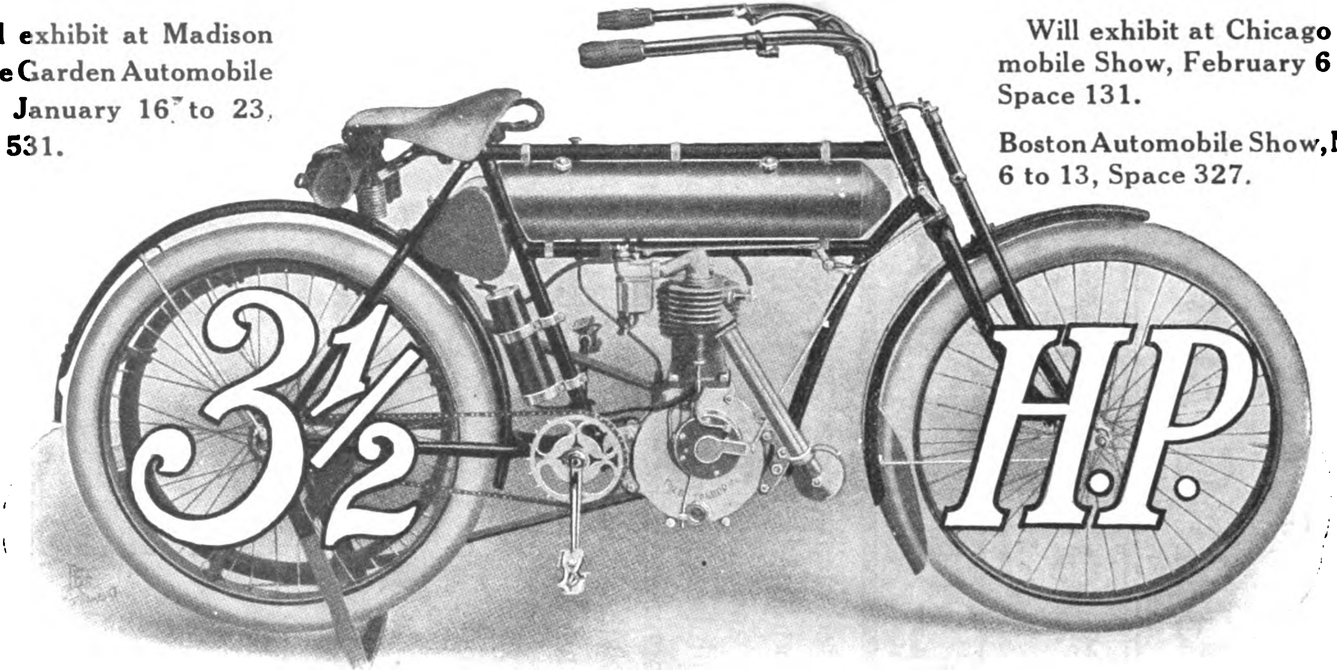
Our 2¾-H. P. model is the most attractive, complete and efficient proposition offered by any manufacturer and represents more ACTUAL VALUE for the money than anything ever produced. It is the biggest money maker for the dealer.

## POTTSTOWN, PA., - U. S. A.

**Will** exhibit at Madison **Square** Garden Automobile **Show, J**anuary 16 to 23, **Space 5**31.

Will exhibit at Chicago **Auto**mobile Show, February **6 to 13,** Space 131.

Boston Automobile Show, **March** 6 to 13, Space 327.



# 1909 YALE 3½ H. P. MOTORCYCLES—$200

***Made for men with good red blood***

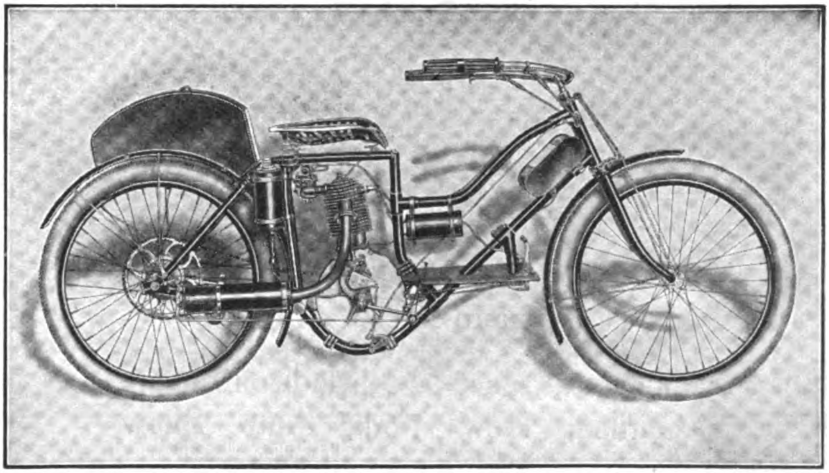
**An American betterment of the finest foreign models. Easy running, powerful, reliable, swift. Its equal at the price does not exist today.**

Live Agents wanted in unoccupied territory.

THE CONSOLIDATED MFG. CO., 1710 Fernwood Ave., Toledo, O., U. S. A.

# 1909

# New Era Auto-Cycle



**[PATENT PENDING**

We call attention to the fact that the New Era Auto-Cycle is the most comfortable riding Auto-Cycle ever built.

WE LEAD, as the New Era Auto-Cycle is the first and only machine on the market of its class. It has been thoroughly tested, and the highest state of perfection reached. See our exhibit, space 552, at Madison Square Garden, January 16 to 23.

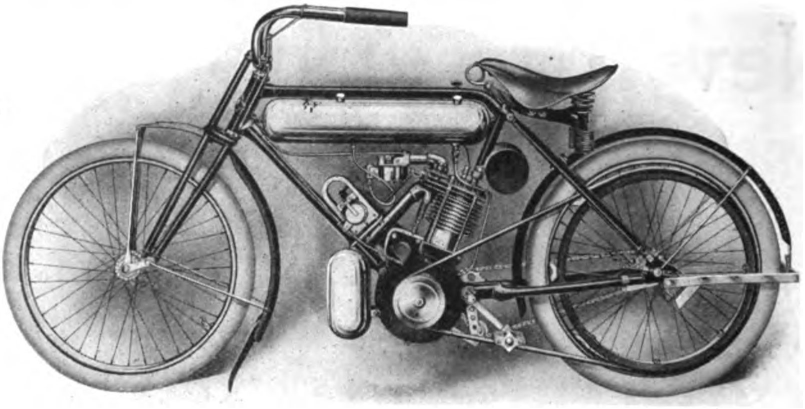
## Good Features

TWO SPEEDS. SLOW AND HIGH SPEED AND BRAKE ARE OPERATED BY THE FEET ON THE FOOT BOARD. FREE MOTOR. COMFORTABLE FORM SEAT. 60 INCH WHEEL BASE. MOTOR IS STARTED BY MEANS OF A CRANK, SAME AS AN AUTOMOBILE. 3½ H. P. SINGLE CYLINDER MOTOR.

Dealers interested should write for catalogue now.

**The New Era Gas Engine Company**
**7 Dale Ave., DAYTON, OHIO**

# M-M



MAGNETO SPECIAL, 3½ H. P.

Shown at space 535, Madison Square
Garden, New York, Auto Show

Conceded by far the best Motorcycle exhibit at the Show.

Five distinct models with more improvements than all others combined.

Look the line over. Secure a catalog. Let us tell you the "WHYS."

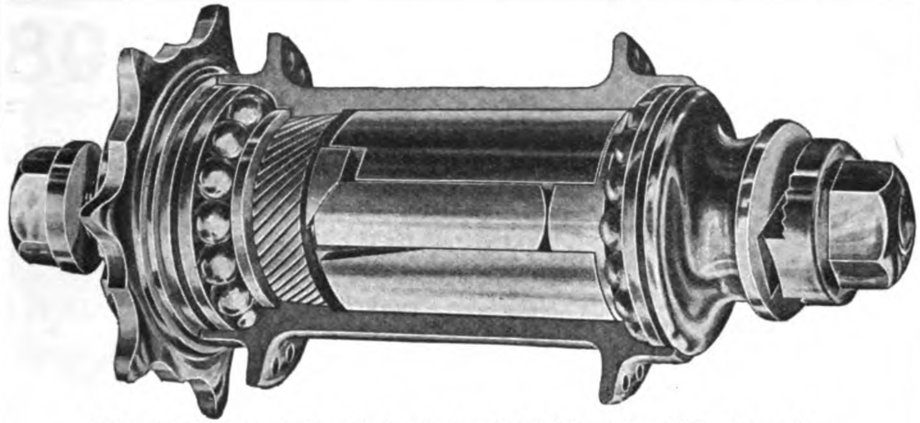
"It's then up to you."

## OTHER 1909 MODELS

| | | |
|---|---|---|
| M. M. Battery Special | - - | 3½ H. P. |
| M. M. Magneto Twin | - - | 7 H. P. |
| M. M. Roadster | - - - | 3 H. P. |
| M. M. Battery Twin | - - - | 6 H. P. |

## AMERICAN MOTOR COMPANY

**715 Centre Street** **BROCKTON, MASS.**



Outer part cut away, to show the few parts and simplicity and certainty of operation

# The 1909
# ECLIPSE COASTER BRAKE

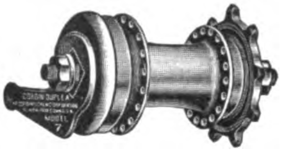
Everybody thought the **Morrow** Coaster Brake was just about as near perfect as a coaster brake could be made, and it certainly was a good one. We were not content, however, to rest on the laurels already won, but kept studying and experimenting to see if improvements could not be made, and discovered points that would bear refining and simplifying. We give you the result in the **New Eclipse.** It is small—weighing only 27 ounces—but a giant in power. It is simple—there are only eight parts in the **Eclipse**—but effective. It has no springs, no weak parts, no lost motion, no engaging teeth, no back lash and no drag. In short, it is the ideal coaster brake, being strong, powerful and dependable. Be sure that all your motorcycles and bicycles have this equipment, if you want to handle the bulk of the trade in your town.

**The Eclipse Machine Company**

**ELMIRA, N. Y.**

# Corbin Hubs for 1908

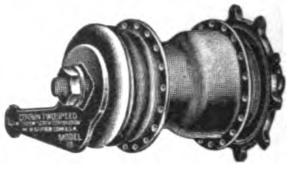
**CORBIN DUPLEX**



**Coaster Brake, Model 7**

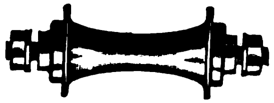
## Special Heavy Models for either Chain or Belt Drive Motorcycles

**CORBIN TWO-SPEED**



**Coaster Brake, Model 10**

**CORBIN**



**Front Hub Model 16**

**Catalogue on request**

**Window Display Cards on request**

## The Corbin Screw Corporation

**New Britain, Conn.**

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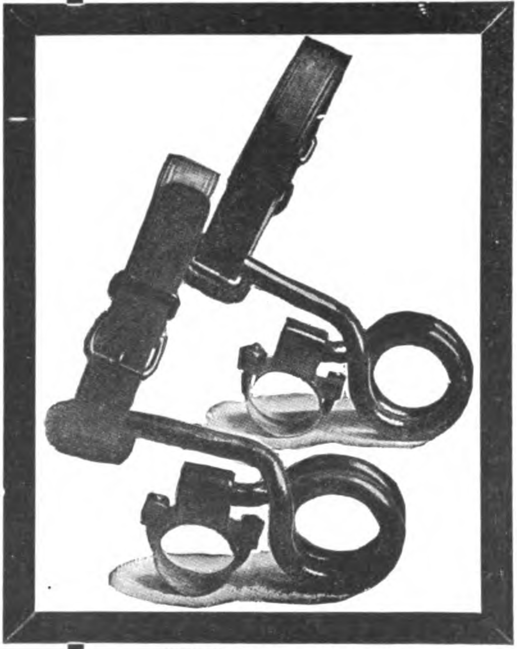
# No Bumps, No Jolts, No Jars!



*"The Comfort's in the Coil"*

## JUST AN EASY GLIDE--That's All

It makes no difference how many so-called shock absorbers you have used, you don't know one-half the joys of automobiling unless you have tried THOMAS SHOCK ABSORBERS—they're simply wonderful. THOMAS SHOCK ABSORBERS positively eliminate upthrow. This means easier riding—more speed—less wear on tires—no broken springs, and fewer repairs. Do not interfere with the natural downward action of springs. Easily attached to all cars; no adjusting necessary. Act instantly, no matter how fast shocks may come. Save time, tires and trouble. Equally adapted for either elliptic or half spring cars. Experts say THOMAS SHOCK ABSORBERS are perfect—at half the price of others, too. Send for special 30 days' free trial proposition, and enjoy real automobiling at our expense.

## Buffalo Specialty Company,

381 Ellicott St. - - BUFFALO, N. Y.

F.A.M. NATIONAL ENDURANCE CONTEST 1908

# Let's Get Down to Facts!

Don't you want the easiest riding the strongest, most powerful and the best built machine you can get?

Do you know **why** the many exclusive features of the **CURTISS** make it just **that** machine?

It's easy to figure out:

**CURTISS** engines are roller bearing throughout. Hardened and ground steel rollers running between two hardened and ground steel bushings. Easy running, positively indestructible, no trouble from heating or running dry. (Compare them with bronze.)

The **CURTISS** 28 V Belt Transmission is the best in the world for motorcycles. Used exclusively abroad. Clean, silent, economical, requires no attention. No severe tension on bearings. (Compare it with other forms of transmission.)

The **CURTISS** trussed frame and fork is the strongest construction known. Frames never break down or get out of alignment. The long wheel base assures easy riding, so necessary on a long tour or in every-day service. The large fuel capacity, correct motor position, etc., are features not to be ignored.

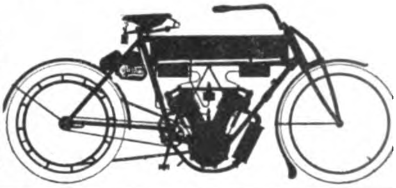
"There's no doubt about their being fast."

World's record, 1 mile single cylinder, 56⅘ sec. World's record, 1 mile double cylinder, 46⅖ sec.

## "Powerful and Reliable"

Only Diamond Medal 1907 F. A. M. Endurance Run.
Highest Awards, both classes, 1908 F. A. M. Endurance Run.

Two new models for 1909, 3½ and 7 H. P. Don't fail to learn about them. We're now closing up territory. If you want to handle the best, better write to-day.



**G. H. CURTISS MFG. CO.**
**HAMMONDSPORT :: NEW YORK**

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*Just think of "STANDARD" when you are in the market for*

# Bicycle & Motorcycle Parts

### They are all that the name implies

In **Spokes** and **Nipples**, **Pedals** and **Toe Clips** we have the following models to offer:

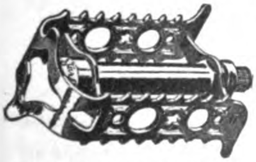
DIAMOND E SPOKES AND NIPPLES

**SPOKES** and **NIPPLES** are high-grade and up to the standard in every particular "Sunbeam" Spokes make a very attractive wheel and glisten like sunbeams; hence the name.

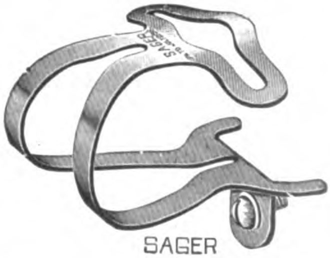
"**Star**," "**Bridgeport**" and "**Standard**" **Pedals** are machined pedals, insuring accurate bearings and durability. Made for men's, women's and children's bicycles and motorcycles.

"**Sager**" and "**Star**" Toe Clips hold the foot securely without undue pressure.

Bicycles and motorcycles with "Standard" equipment, always give satisfaction; so be sure to specify it.



NO. 3 STAR R. T. PEDAL



SAGER

**THE STANDARD COMPANY, Torrington, Conn.**

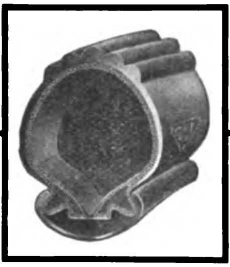
SOME LIVELY SUBSCRIPTION
AGENTS WANTED

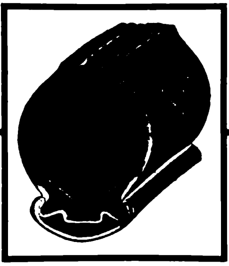
THE 1909 LINE OF

# Reliance Motorcycles

will consist of five models, three of the single cylinder type, and two of the double cylinder type. Anyone who is interested in the best motorcycle proposition of the year will please write for literature.

**RELIANCE MOTOR CYCLE CO.**
**OSWEGO, N. Y.**





When it comes to tire quality there's only one kind the motorcycle riders are really positive about—that's

**INDIANAPOLIS DOUBLE CLINCHER**

# G&J TIRES

Their popularity and preference is due altogether to the fact that they have always made the best showing, whether for speed, reliability, endurance or every-day use.

**G & J TIRE CO.**
**INDIANAPOLIS - - - INDIANA**

HAVE YOU READ THE

**Judges' Report of the 900-Mile A. C. U. British Reliability Trials?**

**OUR CELEBRATED CUSHION GRIPS**

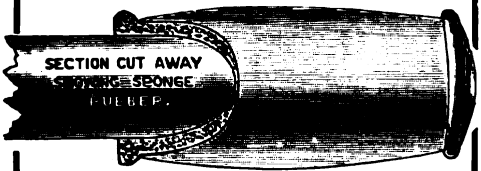
are very appropriately called "KUMFO" in Great Britain

**We quote from the Official Report, as follows:**

(SUBJECT) "Handles—With two exceptions there was nothing new in Handles. One exception was the Kumfo Grip which is certainly an improvement on the usual fitting, etc."

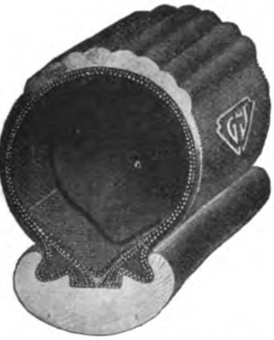
(Signed by Judges.)
J. W. G. Brooker
H. G. Cove
A. Geo. Reynolds
Archibald Sharp

**THIS EXCEPTIONAL GRIP SHOULD INTEREST YOU**



**CAN YOU AFFORD TO PASS IT BY?**

**Made by MATTSON RUBBER CO., Lodi, N. J. And sold by All First-Class Supply Men Everywhere**



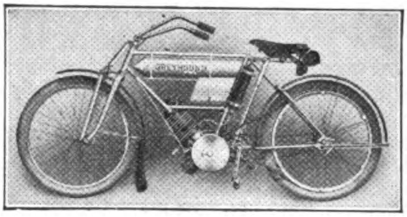
INDIANAPOLIS

**G & J Bicycle Tires**

Everybody prefers these tires because they are the highest quality, the easiest riding and the easiest to repair when punctured. No tools required. No cement to hold them on the rim

Handled by all dealers.

**G & J TIRE CO.**
INDIANAPOLIS, IND.



**GREYHOUND MOTORCYCLES**

¶ The latest product of the longest experience.

¶ We know that the 1909 GREYHOUND is unexcelled in matters of material, mechanical treatment, etc.

¶ We claim without qualification that there is no other motorcycle that approaches it in simplicity, ease of control or absolute comfort to the rider.

¶ THE GREYHOUND SHOCK ABSORBER IS THE GREATEST COMFORT DEVICE EVER APPLIED TO A MOTORCYCLE. This, in connection with our big tires and perfect spring fork, kills all shock and vibration.

¶ The boneshaking days of motorcycling are over. Take cobblestone pavements at ANY SPEED with a GREYHOUND SHOCK ABSORBER (patented) WITHOUT discomfort.

¶ NOW is the word in every department—machines for immediate shipment.

¶ We shall exhibit at the big shows, New York (The Garden), Boston, Chicago.

¶ Agency correspondence always welcome.

¶ Catalogues are free as air.

**The Auto-Bi Company**
**Oldest American Motorcycle Manufacturers**
**1463 Niagara St., Buffalo, N. Y.**

# Motosacoche

# Minerva

# Wagner

As usual, we will have the LEADERS for 1909, both American and foreign; and as heretofore we will continue to blaze the way for others to follow.

## Minerva, the Road King

The 1909 MINERVA will include among other improvements, the following:

Bosch Magneto on all models.
G. and A. Carburetor, with Auxiliary Air Inlet.
Large Oil Pump.
Back Pedaling Brake, with larger and wider drum and Band Brake, operated by pedal near the footrests.
Throttle and Spark Advance controlled by handle bar grips.
Continental non-skid tires.
Models to be carried 4½ and 8 H. P.

## Motosacoche, the Lightweight King

Bosch Magneto, shaft and bevel gear driven, the whole enclosed in a water tight aluminum case.
Mechanically operated valves.
"V" Belt Transmission.
Will develop 3 H. P.
Speed limit 45 miles an hour.
Weight of the Double Cylinder Model 80 pounds.

## Wagner, the Endurance King

The Wagner riders have been clamoring for more power; the 1909 Wagner will be a full 3½ H. P., the cylinder measuring 3¼ by 3¼. The 1909 Wagner will also have:

The Shamrock Gloria Rubber Belt, the best in Europe.
Double Grip Control.
Float Feed Carburetor.
Gasolene and Oil Capacity doubled.
Sager Spring Fork.

The Wagner is the only single cylinder model we will handle for the 1909 season.

Write to us for Agency propositions on any of the above.

(Prices on above models to be announced later.)

**Geo. V. Lyons Motor Co.**

2382-4 Broadway, New York City

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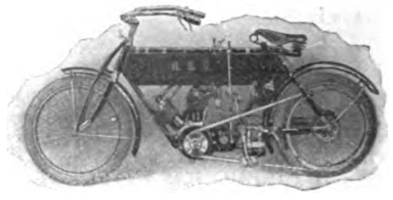
# NSU

# MOTORCYCLES



6 H. P. Touring Model

☞Their popularity is based on solid and proven facts, and their complete state of perfection has induced an enormous demand in every state. Order early—"A word to the wise."

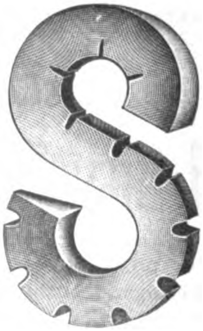
1¾ Popular Light weight, 80 lbs.
Single and Twin cyl. Touring Models
" " " F. A. M. Models
3 H. P. Twin cyl. Model De Luxe
4 H. P. Single cy. Model De Luxe
7 H. P. Twin, Special Racer

# SPECIALTIES

**N. S. U. Two Speed Gear**
**N. S. U. " " Hub**
**N. S. U. Belt Fasteners**
**N. S. U. Non-Skid Device**
**N. S. U. E.S. Spark Plugs**
**AND**

## Shamrock Gloria Rubber Belts

The Record 70 Miles an Hour



The World's Best Belt

**SEE US AT THE**
**New York and Phila. Shows**

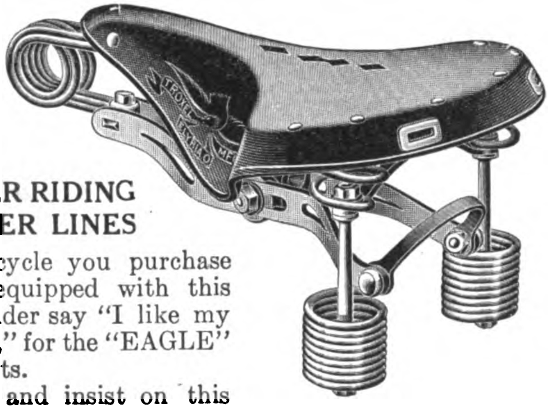
**N. S. U. Motor Co.**

206 W. 76th St., New York

# "The Best Motorcycle Saddle Ever Manufactured"

## ALLOW US TO PROVE THIS TO YOU

## Why Not Have the Best?



This is the comment we receive on the **TROXEL EAGLE MOTOR SADDLE.** This statement covers the following points.

**MORE DURABLE, EASIER RIDING**
**LOWER POSITION, FINER LINES**

No matter what Motorcycle you purchase you will like it better if equipped with this Saddle. No longer can the rider say "I like my Motorcycle all but the Saddle," for the "EAGLE" is a combination of good points.

MR. DEALER, specify and insist on this Saddle when ordering your Motorcycles. It will make you friends and money.

**Troxel Eagle Motor Saddle**

Length, 13¾ Inches
Width, 12 Inches

**WRITE FOR CATALOG**

**The Troxel Manufacturing Co., Elyria, Ohio**

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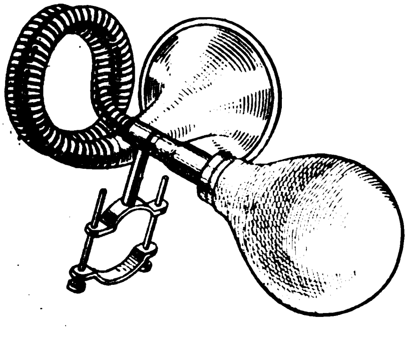
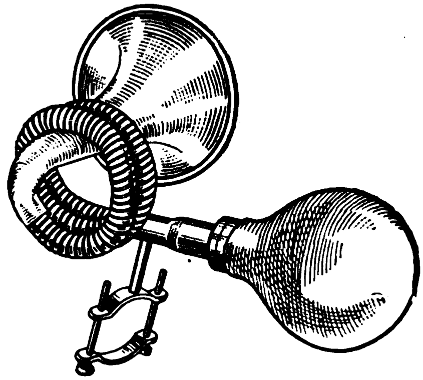
# MOTOR CYCLE HORNS

## SOMETHING NEW

**Patent Applied For**



Bullfrog Horn, No. 50



Bullfrog Horn, No. 51

## Bends are made of Flexible Tubing

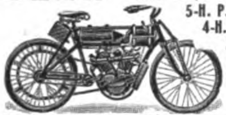
**Fine Deep Tone. Low in price**

**No. 50, bell 3¾ inches. No. 51, bell 4 inches.**

These horns are **New** and **Novel**, and are first-class goods. Large bulbs (our No. 68) on both horns Brass only. Order through your jobber. Best selling horns made. Electros free.

**STEVENS & CO., 99 Chambers St., N. Y. City, U. S. A.**

GEER MOTORCYCLES



5-H. P. 2-cylinder GREEN EGG - - $225.00
4-H. P. BLUEBIRD - - - - 200.00
2½-H. P. GEER Model 4 150.00
Used motor-cycles - - - 40.00

We have the largest line of new and used motorcycles in the country at the lowest prices. Every machine guaranteed. Repairs a specialty. Motors and castings for air-ships. Motors for railway velocipedes. Send for catalogue.

Harry R. Geer Co., 856 McLaran Ave., St. Louis, Mo.

Make a Motorcycle of Your Bike

at small cost by using our Attachable Outfit. It fits any bicycle. Send stamps for catalog. Also Motor Attachments for railroad velocipedes. Send 15 cts. for "The Motor-Cycle Manual." It treats of motor-cycles; how to get more power, etc.

SHAW MFG. CO., Dept. J, Galesburg, Kan.

F. A. BAKER & CO.
MOTORCYCLE
SUPPLIES
SEND FOR CATALOGUE
37 Warren St., New York

BRAZ-IRON FOR

A AND J
A NEW REPAIR HANGER
Adjustable for Width
" " Diameter
One Hanger fits all wheels. Write
THE A. & J. MFG. CO.
26 W. Randolph St., CHICAGO, ILL.

BRAZING CAST IRON

Motorcycle Accessories
Repairs, Parts and Supplies
Indians, Thors and Royals
Send for complete catalogue.
F. B. WIDMAYER, 2312 Broadway, New York City

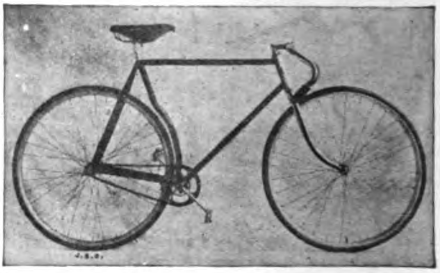
SPROCKETS
for Bicycle and Motorcycle
WE MAKE 90 PER CENT OF THE SPROCKETS USED
THE PARISH & BINGHAM CO.
Cleveland, Ohio

Who would think of building Bicycles, Coaster Brakes, Lawn Mowers, Sewing Machines and etc., etc., without using The STAR BALL RETAINERS therein?

WHO, tell us?

THE STAR BALL RETAINER CO.
LANCASTER, PA., U. S. A. and
BERLIN S. O, 36, GERMANY

J. W. GRADY & CO.
WORCESTER, MASS.



The New England Racer

The only sprint wheel in the world properly built for board tracks.

Agents wanted all over the country

Wear Well
PATENT APPLIED FOR

THE WEAR WELL
Rubber Bicycle Grip

Every progressive dealer should have them in stock.

MOTORCYCLE SUPPLIES
• SEND FOR CATALOGUE •

More Agents Wanted

3 H. P.

1908 ERIE MOTORCYCLE
LIST PRICE, $175

We have also a special outfit for converting the bicycle into an up-to-date motorcycle. Send for either catalog.

MOTORCYCLISTS—send 15 cents for our new book "The Motorcyclist." It tells all about the care of motorcycles.

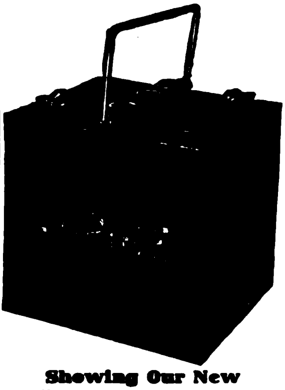
MOTORCYCLE EQUIPMENT & SUPPLY CO. 3 LAKE ST., HAMMONDSPORT, N. Y.

TORPEDO MOTORCYCLES

Torpedo stands for Quality and Quality means Price. Buy a Torpedo and get both. Write for Catalog.

We make the following Models for 1909:
Model B .................... $190.00
" C .................... 225.00
" G .................... 250.00
" F Twin Cylinder .......... 275.00

Hornecker Motor Mfg. Co., Geneseo, Ill., U.S.A.



**Showing Our New "67" in Wooden Case**

# The Empire Battery for 1909

THE EMPIRE STORAGE IGNITER for 1909 will be made in the same degree of mechanical correctness, durability and efficiency that has marked its success in the past with what improvements it was possible to make.

The past season has demonstrated to the user the claim made by us, that the EMPIRE has no superior.

It is the only non-sulphating battery, of high capacity, and great durability. It is constructed of the best possible material, and on correct mechanical lines.

We offer our battery to the Automobile and Motor Boat users, for igniting and lighting purposes, in two styles and two sizes, as follows:

| VOLTS | | AMPERES | | |
|---|---|---|---|---|
| 6 | — | 60 Rubber Case | . . . . . . . . . . . . . . . . . . . . | $16 00 |
| 6 | — | 60 Wood Case | . . . . . . . . . . . . . . . . . . . . | 15.00 |
| 6 | — | 80 Rubber Case | . . . . . . . . . . . . . . . . . . . . | 20.00 |
| 6 | — | 80 Wood Case | . . . . . . . . . . . . . . . . . . . . | 18.00 |

**Other Sizes Made to Order at Short Notice**

Manufactured by **THE EMPIRE BATTERY COMPANY**

**Sales Office: 123 W. 68th Street, NEW YORK CITY**

**LIBERAL DISCOUNT TO THE TRADE** **Write for Terms on Unassigned Territory**

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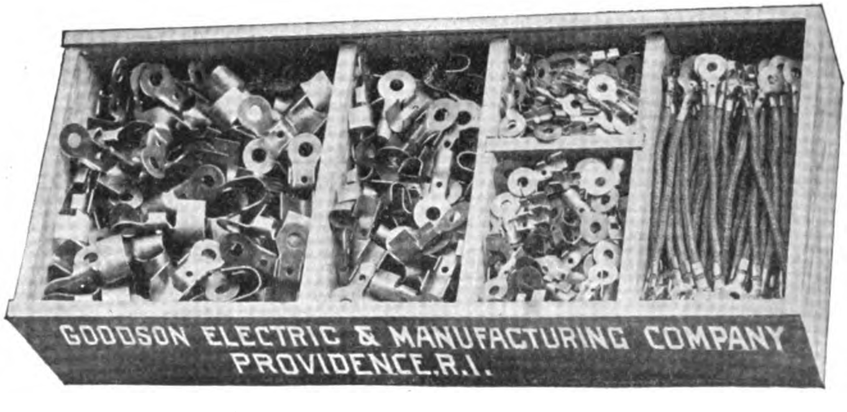
# SPECIAL INTRODUCTORY OFFER

In order to introduce the Goodson Battery Connectors and Wire Terminals into every garage we are putting out a **special case** containing 100 connectors and 400 wire terminals (100 of each size).

Each size terminal is in a separate compartment and **this case** should be in every garage.

These connectors and terminals would cost between $6.00 and $6.50 **without the case** if purchased from any other manufacturer. Our price, **including case**, $4.00. Terms, cash with order. Your money back if not satisfied. Samples mailed on receipt of 5 cents in stamps.

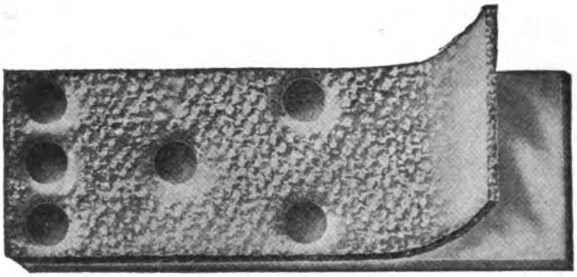
Renewals can be had at very low prices.



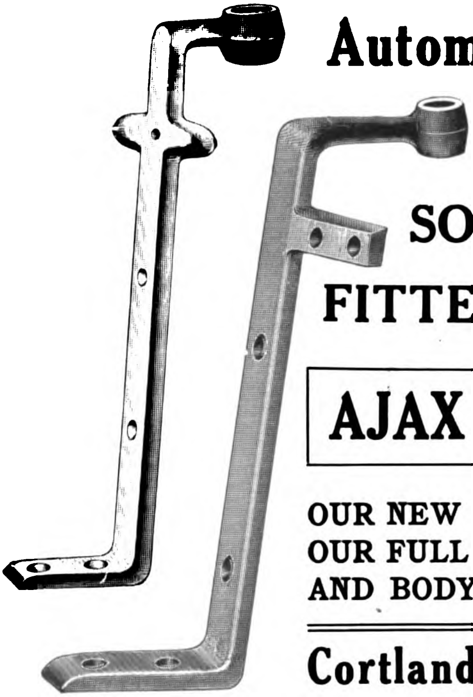
Send us your order today, before you forget it

**Goodson Electric and Manufacturing Company**

**PROVIDENCE, R. I.**

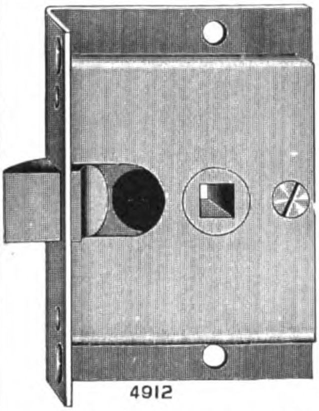


Thermoid
BRAKE LINING
WILL NOT BURN GRIPS INSTANTLY
LASTS INDEFINITELY
A man is Known by the Company He Keeps. A Company is Known By What it Keeps
THERMOID REFLECTS CREDIT
Trenton Rubber Mfg. Co., Trenton, N. J.



Automobile Body Irons
ALL STYLES
SOLID FORGED and FITTED TO PATTERN
AJAX Auto Bow Sockets
OUR NEW CATALOGUE "D" DESCRIBES OUR FULL LINE OF AUTOMOBILE TOP AND BODY IRONS.
Cortland Forging Co., CORTLAND, New York

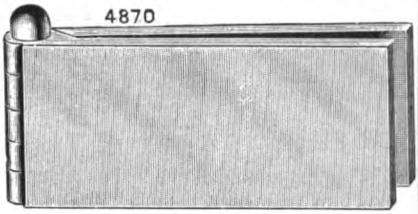
# AUTOMOBILE MOUNTINGS

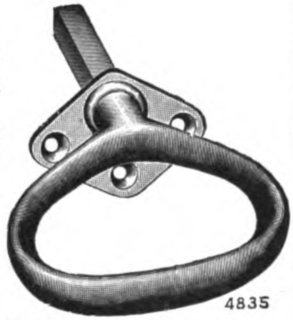


**The Name**
**OF**
**Jos. N. Smith & Co.**
**DETROIT, MICH.,**

is always associated with the BEST there is in

**Automobile Mountings**





**A Partial List of What We Manufacture**

SIDE DOOR LOCKS
AUTOMATIC HOOK LOCKS
MALLEABLE COACH HINGES
BRASS COACH HINGES
SIDE DOOR HANDLES
DASH MOLDINGS
RUNNING BOARD MOLDINGS
CARPET BINDING
BOW SEPARATORS
BOW RESTS
HOOD HINGES
DECK RAILS
LAMP BRACKETS
COAT OR ROBE RAILS
FOOT RESTS (Folding)
HOOD HANDLES
CURTAIN FASTENERS
FOOTMAN LOOPS
KEY HOLE COVERS
HEEL BOARD CATCHES
SNAP LOOPS
TIRE HOLDERS
STRAP LOOPS
BODY OR GRAB HANDLES
CONTINUOUS HINGES
FINISHING BOLTS
WIND SHIELDS (Ackerman)
FINISHING SCREWS
WASHERS
and many other useful articles.

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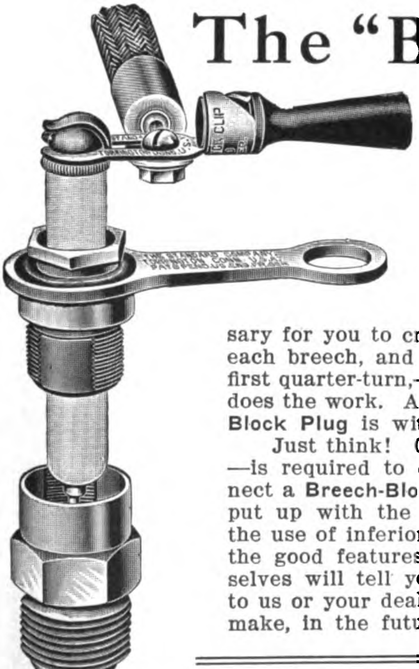
# The "Breech-Block" Plug



There are many reasons why you should use **the Breech-Block Plug,** but probably the one which will appeal to you most forcefully at this time of year is the fact that it is the **"Cold-Weather"** Plug. With the **Breech-Block** it is not necessary for you to crank your arm off starting up. Simply open each breech, and squirt in a few drops of gasoline, and the first quarter-turn,—no matter how stiff and cold your engine—does the work. As a time, labor and temper-saver the **Breech-Block Plug** is without a rival.

Just think! Only **four seconds**—one-fifteenth of a minute—is required to disconnect, open, clean, replace and reconnect a **Breech-Block!** Isn't it just a wee bit foolish of you to put up with the inconvenience and troubles resulting from the use of inferior plugs? We could tell you lots more about the good features of the Breech-Block, but the plugs themselves will tell you more forcefully. Send for a set, either to us or your dealer. We know you will never use any other make, in the future.

½ STANDARD

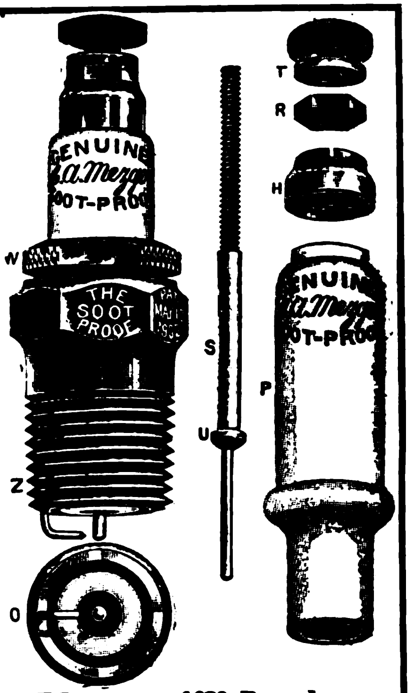
**The Standard Company, Torrington, Conn.**

## "SOOT-PROOF"

# SPARK PLUGS

**Since 1902 Have Been Standard Equipment for High Grade Automobiles**

**They are more popular to-day than ever and can be found on sale at all first-class supply houses, garages and auto agencies**



**Send for Catalogue and Prices**

**C. A. MEZGER, Inc., Mfrs.,** **1629 Broadway NEW YORK**

**National Sales Corporation, Factory Sales Managers, 296 Broadway**

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# National Coils and National Spark Plugs

NATIONAL COIL CO.

**Dash Type**

## Insure Efficiency, Reliability, Economy and Quality

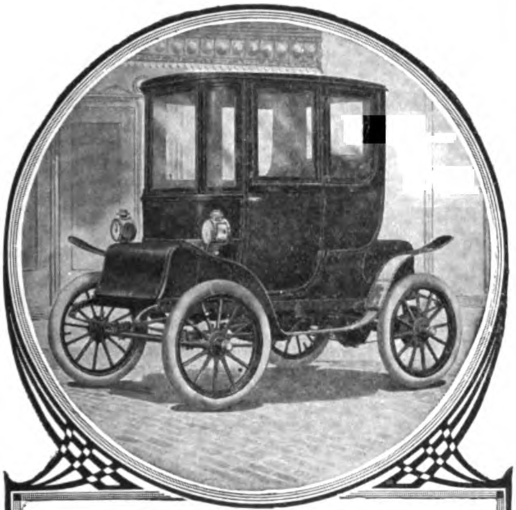
The COIL that holds the world's record for non-stop runs, 4,492 miles on Reo Car. Also on the Pilot Car in the New York to Paris race.

Question: Why was the NATIONAL COIL used?

Answer: RELIABILITY.

WE ARE THE MAKERS OF THE
RELIABLE NATIONAL BOX COIL

**NATIONAL COIL CO.,** Incorporated **Lansing, Mich., U. S. A.**



New Model 1909
Inside operated 4-Passenger Coupe

## THE BAKER TELLS ITS OWN STORY

Quality is in every part.
Simplicity is in every feature.
Dignity is in every line.

The great Baker Factory with its corps of expert electrical and mechanical engineers, and its magnificent equipment, make Baker Electric Vehicles the Standard of the World.

## Baker Electric Vehicles

are perfect—the most durable, most economical and most practical electrical vehicles made.

Every operation of a Baker car is concentrated in two levers—steering and controller. There is no controller as simple as the Baker Controller. It gives the six forward and three reverse speeds without jar or jerk, and will not "arc" or freeze.

The Baker Motor uses less current and gives greater mileage than any other motor made.

The perfect cleanliness, noiselessness, simplicity and safe operation of the Baker is keenly appreciated by every owner.

Examine all these features in the Baker Electric Vehicles at the Automobile Shows and judge for yourself.

*Write for particulars regarding agency and ask for catalogue*

describing the complete line of Baker Coupes, Broughams, Victorias, Landaulets, Surreys, Runabouts, Roadsters, etc.

**Baker Motor Vehicle Co.**
**35 W. 80th St., Cleveland, Ohio**

---

## TANKS

**ALL SIZES**

AIR
FILLING PLUG
SEAMLESS STEEL
TANKS
TINNED & TESTED
JANNEY, STEINMETZ & CO. PHILA.
GASOLINE

IN STOCK READY
SPECIALS TO ORDER

AIR
FILLING PLUG
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TANKS
TINNED & TESTED
JANNEY, STEINMETZ & CO. PHILA.
GASOLINE

WRITE FOR BOOKLET
NEW 1909 PRICE LIST

AIR
FILLING PLUG
SEAMLESS STEEL
TANKS
TINNED & TESTED
JANNEY, STEINMETZ & CO. PHILA.
GASOLINE

LITTLE ONES AND
GREAT BIG ONES

AIR
FILLING PLUG
SEAMLESS STEEL
TANKS
TINNED & TESTED
JANNEY, STEINMETZ & CO. PHILA.
GASOLINE

SAFE, SURE, LEAKLESS
GASOLINE IS DANGEROUS

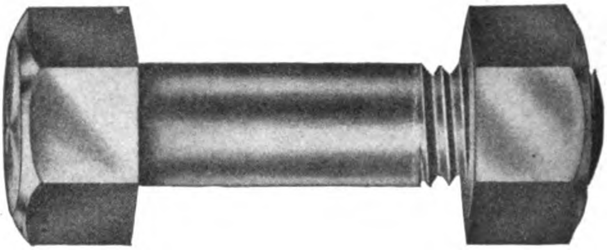
AIR
FILLING PLUG
SEAMLESS STEEL
TANKS
TINNED & TESTED
JANNEY, STEINMETZ & CO. PHILA.
GASOLINE

CHEAP "DON'T CARE" CARS USE
CHEAP "MAKESHIFT" TANKS

## TANKS

**THAT'S ALL**

**30** Years Making Screws
AND
Screw Machine Products



**We make a Specialty of AUTOMOBILE PARTS
TO A L. A. M. STANDARD**

***SEND US YOUR BLUE PRINTS***

**DETROIT SCREW WORKS, DETROIT, MICH.**

MUTTY'S
AUTO TOP FABRICS
1909

Sample books showing Mackintoshed cloths, single texture French and English Ducks, double and single texture Auto Leathers and Rubber cloths, and the only line of **Genuine Mohairs** on the market.

Get our sample book and compare our prices and quality with all others

L. J. MUTTY CO., BOSTON, MASS.

**See our exhibit in space 229 at Madison Square Garden, January 16 to 23**

Gas and Gasolene
ENGINE
VALVES

We are specializing in the Forging of High Nickel Alloy for this purpose.

We are Succeeding—Present orders prove Material Right—Workmanship Right—Prices Right.

Ask for list and prices of over one hundred stock die sizes.

We also make Drop Forgings generally.

**Crescent Forgings Company**
**OAKMONT, PENNA.**

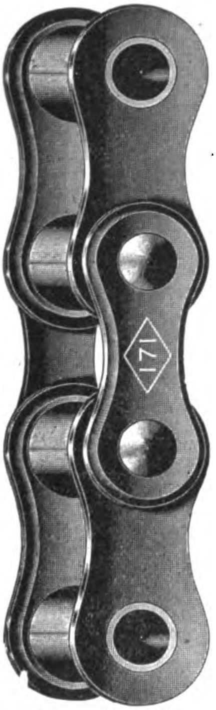
LUNKENHEIMER
LUNKENHEIMER

Good OIL or GREASE CUPS ought to last a life time. They should have NO COMPLICATED PARTS and should be made of CAST (not spun) BRASS. The feed ought to be easily regulated and the flow steady and positive.

Lunkenheimer Oil and Grease Cups are designed according to above specifications. Largest and most complete line made. Write for catalog.

The Lunkenheimer Company
Largest Manufacturers
of High Grade Engineering Specialties in the World
General Offices and Works, Cincinnati, Ohio, U. S. A.
Branches: New York, 66-68 Fulton St.
Chicago, 32 Dearborn St., Corner Lake.
London, S. E. 35 Great Dover St.

179



# Chain Drive Growing in Favor!

## *WHY?*

## Efficiency and Economy

At the Paris Salon, 1909, there were a greater number of chain driven cars than ever. M. Georges Dupuy, the eminent French authority, comments as follows:

"There is a general tendency towards the chain, the cardan shaft having lost many of its admirers. It has been generally demonstrated on our European roads that the "non-suspended weight," the straining upon the differential gears (whenever there is a difference of level between the two traction wheels), the instability of the rear part of the car at high speed, and above all, the wear upon the tires, are strong factors against the popularity of the shaft-drive. European manufacturers will now equip almost all of their models with the good old chain."

DIAMOND CHAINS always were good, but now they are "BETTER THAN EVER."

Contrasting Gear Drive, Diamond Chain drive is simple, flexible, runs smoother, is easier on the tires, may be more easily repaired and permits an inexpensive and quick change in gear ratio by simply changing a set of sprockets.

*Write for Booklet*

**Diamond Chain & Mfg. Company**
**260 W. Georgia Street, Indianapolis, Ind.**
**(Capacity 8,000,000 feet per year)**

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WE SAVE YOU FROM 10% TO 50% ON AUTOMOBILE SUPPLIES

CATALOG FREE

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*Mathew Strauss,*
*707 Main St., Buffalo, N. Y.*

The One Oil for Your Car

No matter what style of car you own — steam or gasoline, touring car or runabout, air-cooled or water-cooled—*there's a special grade of Mobiloil for it.* A wonderful trouble-proof oil that lubricates most at minimum feed. Won't cause fouling of spark plugs and valves.

Vacuum "A" Mobiloil

VACUUM

# MOBILOIL

is the right oil for *your* car under all conditions. As a safe and scientific lubricator for every style and type of automobile engine it has no equal.

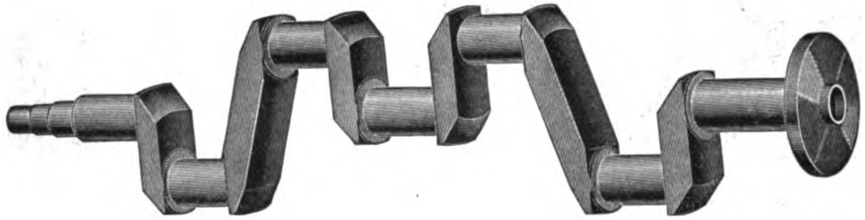
Send for Mobiloil booklet which lists every make of automobile and tells what grade of Mobiloil to use for each. It's free.

Mobiloil in barrels, and in cans with patent pouring spout, is sold by all dealers. Manufactured by

**VACUUM OIL COMPANY, Rochester, N. Y.**

## It isn't a bit too early to think about your 1910

# CRANKSHAFTS



**Were those you used in your 1909 models perfectly satisfactory?**

You know it doesn't pay to take chances with such an important part of a car, so if you have doubts about your present equipment, better be on the safe side and make sure of getting the best that can be made. It is a matter of pride with us that we are supplying the largest and best automobile manufacturers in the country; and we unhesitatingly guarantee our crankshafts to be true to drawings and of the highest quality and workmanship.

**May we have the pleasure of submitting estimates?**

**STANDARD CONNECTING ROD COMPANY, BEAVER FALLS, PENNA.**

# TIRES TIRES

| Sizes | Shoes | Tubes | Sizes | Shoes | Tubes |
|---|---|---|---|---|---|
| 28 x 3 | $ 9.50 | $2.25 | 34 x 4 | $18.00 | $4.00 |
| 30 x 3 | 11.00 | 2.75 | 34 x 4½ | 20.00 | 4.00 |
| 30 x 3½ | 13.00 | 3.00 | 34 x 5 | 17.00 | 4.00 |
| 32 x 3½ | 15.00 | 3.50 | 36 x 3½ | 12.00 | 4.00 |
| 32 x 4½ | 16.00 | 4.00 | 36 x 4 | 18.00 | 4.00 |
| 34 x 3½ | 14.00 | 3.50 | 36 x 4½ | 17.00 | 4.00 |
| 32 x 4 | 17.00 | 4.00 | 36 x 5 | 19.00 | 5.00 |

## A. H. KASNER

**Near Chambers St.** **152 Church St., N. Y.**

**15 Years on the Same Place**

---

It's

The Automatic

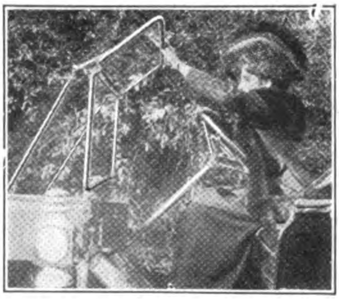
**The Most Talked-of Best-Selling**

**Folding**

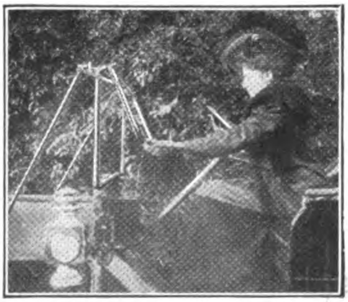
**Wind Shield**

**on the Market**

**Send for Catalogue**



INSTANTLY RAISED



OR LOWERED

NEAT IN APPEARANCE

Grand Central Palace Show
Booth 142

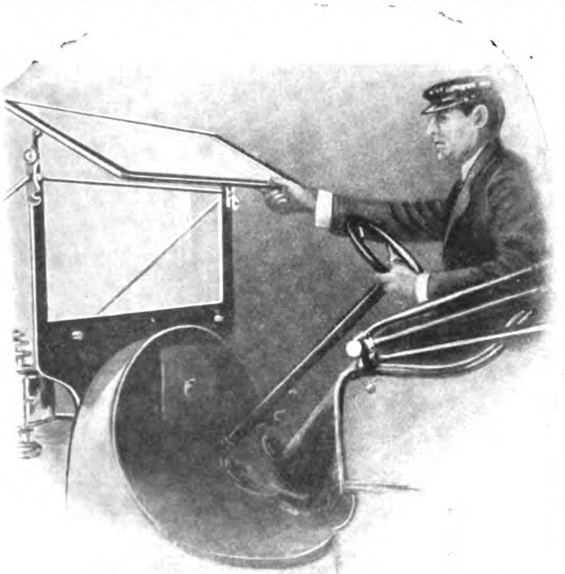
Madison Square Garden Show
Booth 323

**Wanted: A few more live Agents**

## C. A. MEZGER, Inc.

1629 Broadway, New York City

NATIONAL SALES CORPORATION, Factory Sales Manager
296 Broadway, New York City



RUNABOUT, $32.50. TOURING CAR, $35.00

THE BALL FINTZE COMPANY
AVALON
NEWARK OHIO

Models from $15.00 to $50.00

Adaptable to any car and "WON'T RATTLE"

Catalogue Ready

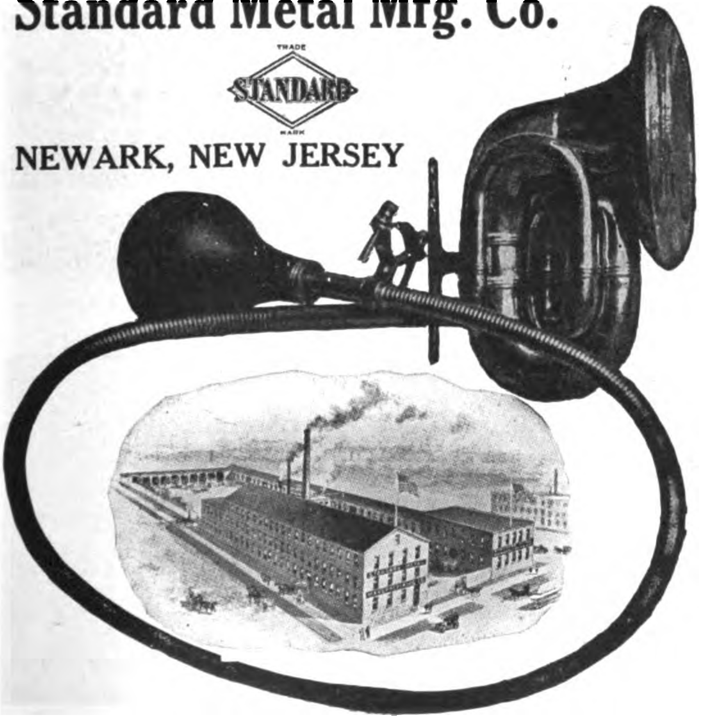
**Ball-Fintze Co.**

10 to 20 Canal St.
NEWARK, O.
108-110 W. 3rd St.
CINCINNATI, O.

**Standard Metal Mfg. Co.**

TRADE STANDARD MARK

NEWARK, NEW JERSEY

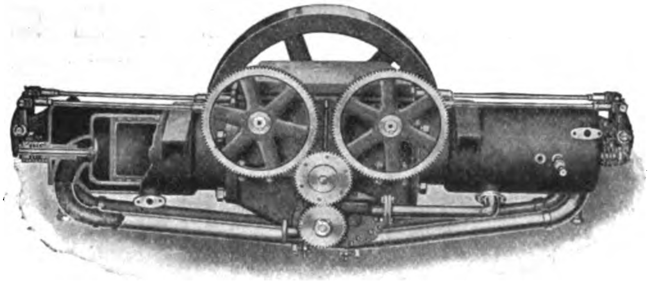


The largest manufacturers of Horns in the United States. We make a full line of

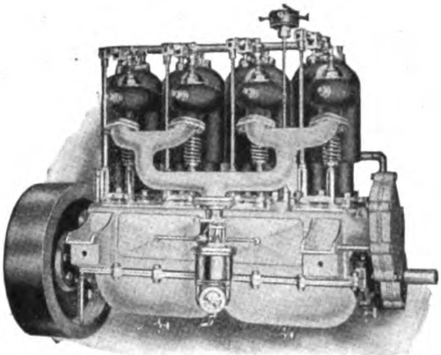
**Auto and Phonograph HORNS**

Also Flexible Tubing and Supplies. Write for catalogue. Our trade-mark guarantees quality; best workmanship. The horns we manufacture are equal in every respect to anything sold in this country,—not excepting those of French manufacture.

CHESTNUT,
JEFFERSON and
MALVERN
Streets

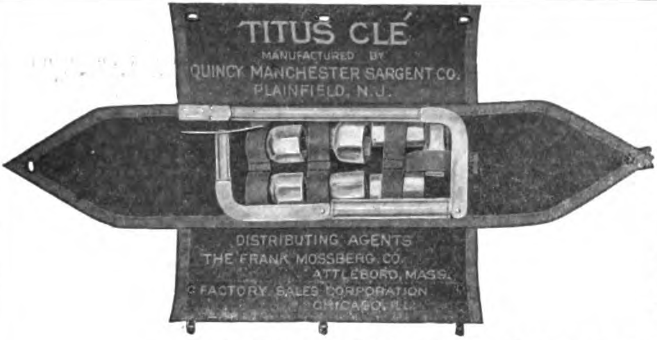


If interested in the most powerful line of motors ever produced, considering weight where bearing surface and strength have not been sacrificed, write for circulars giving full description.



Double opposed motors built in two sizes, 5 x 5-18 H. P. and 5 x 7-24 H. P. Four cylinder motors in three sizes, 4 x 5-30 H. P., 4½ x 5½-40 H. P. and 5 x 5½-50 H. P.

**MODEL GAS ENGINE WORKS**
**PERU, INDIANA, Lock Box 2033**
EASTERN AND FOREIGN OFFICE:
B-21 Produce Exchange, New York


TITUS CLE
MANUFACTURED BY
QUINCY MANCHESTER SARGENT CO.
PLAINFIELD, N.J.
DISTRIBUTING AGENTS
THE FRANK MOSSBERG CO.
ATTLEBORO, MASS.
FACTORY SALES CORPORATION
CHICAGO, ILL.

The
## TITUS CLE

A NEW FOLDING SOCKET WRENCH

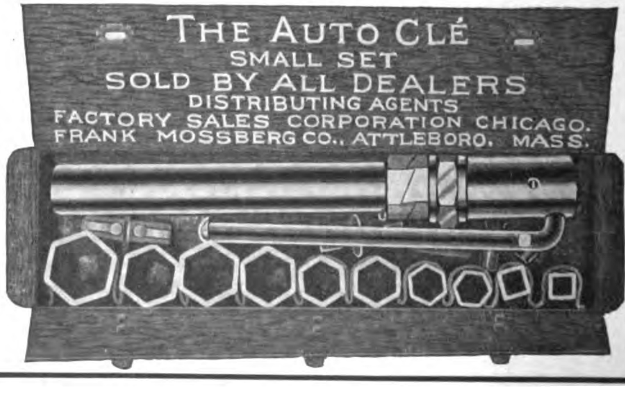
COMPACT,
CONVENIENT,
USEFUL

SOLD BY ALL DEALERS

The
## AUTO CLE

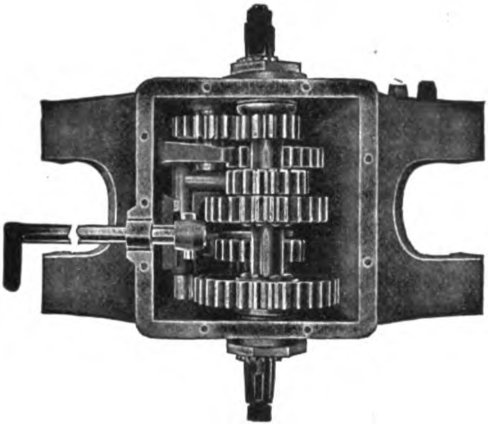
TWO SIZES

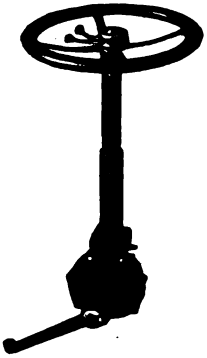
STANDARD SOCKET WRENCH OF THE WORLD


THE AUTO CLÉ
SMALL SET
SOLD BY ALL DEALERS
DISTRIBUTING AGENTS
FACTORY SALES CORPORATION CHICAGO.
FRANK MOSSBERG CO., ATTLEBORO, MASS.

BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE
SLIDING GEAR TRANSMISSIONS





DIFFERENTIALS AND STEERING GEARS

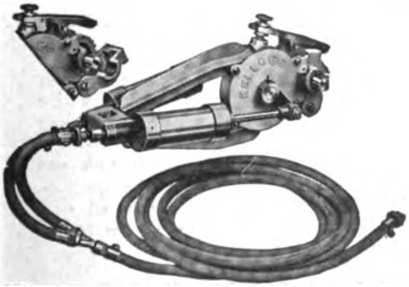
Direct Factory Salesmen:—K. FRANKLIN PETERSON, 166 Lake St., Chicago. THOMAS J. WETZEL, 29 West 42nd St., New York City.
Sales Agent, Carrying Stock:—CHAS. E. MILLER, 97 Reade St., New York; 318-320 N. Broad St., Philadelphia; 202-4 Columbus Ave., Boston; 406 Erie St., Cleveland, Ohio.
Eastern Sales Agents:—POST & LESTER CO., Hartford, Conn.

BROWN-LIPE GEAR CO., 206 S. Geddes St., Syracuse, N. Y.

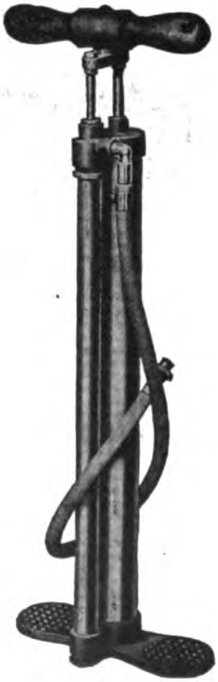
National Pressure Register

Wray
Pump & Register Co.
Rochester, N. Y.

Tire Pumps
and
Pressure Registers
for 1909



Kellogg Engine Driven Power Pump

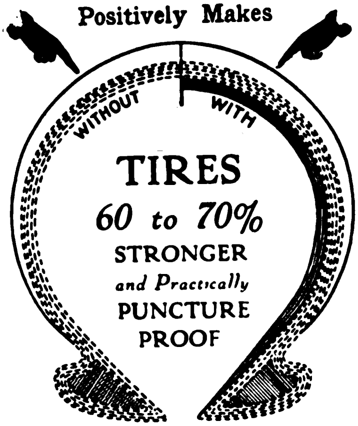


Kellogg 4 Pump]

THE

## "INNERSHU"

Positively Makes



The "Innershu" is a complete

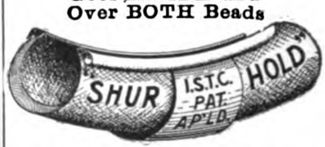
**INSIDE STRENGTHENING FABRIC**

Made of 3 to 4-ply tough and practically puncture-proof fabric. It prevents blow-outs and practically

**DOUBLES THE LIFE OF TIRES**

**A size for every tire and every demand**

Goes INSIDE and Over BOTH Beads



## BLOW-OUT PATCH

EQUAL TO AN EXTRA TIRE

*WILL NOT BULGE*

IF YOUR DEALER DON'T HAVE THEM WRITE

## INNER SHOE TIRE COMPANY

GRAND RAPIDS, MICHIGAN, U. S. A.

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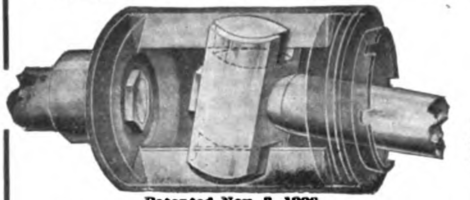
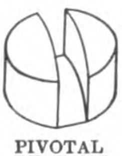
## BLOOD BROS. UNIVERSAL JOINTS



Patented Nov. 3, 1908.

Style H—The upper joint is a universal and slip-joint. The lower one is like it, except the bearing plates are wider and curved on their inner edges to conform to the bottom of the groove in the pivot bearings to prevent endwise movement of the shaft. Structural parts, cylindrical in form, make an oil-tight case, and do not take any of the wear.



PIVOTAL BEARING

Sliding bearings, made of tool steel, hardened and ground to size. Interchangeable and reversible for wear.

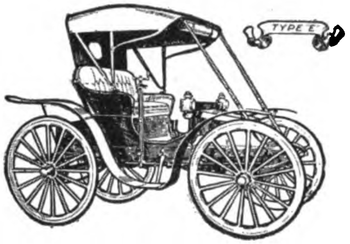
Style A—Our well-known yoke and center-block pattern, noted for its great strength and durable qualities. Made in all sizes up to three inches.

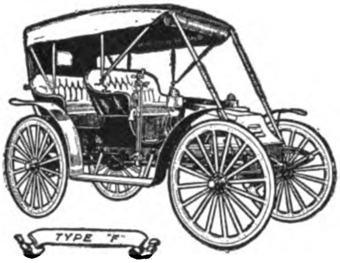
## BLOOD BROS. MACHINE COMPANY

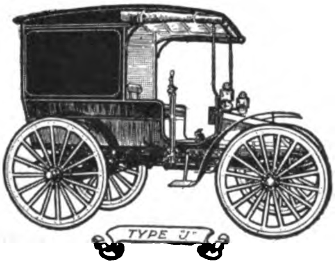
MANUFACTURERS

KALAMAZOO, MICHIGAN

# The Reliable Dayton Line







## THE RELIABLE DAYTON HAS MADE GOOD

**DEALERS:**

It is not a $75 buggy with a $50 motor in it, but it is a **motor car** from the ground up. It is making business for itself in every territory it invades, through its economical features, compared with the pneumatic-tired car.

Let us refer you to several of the country's large dealers, who have handled the Reliable Dayton the past year. Let them tell you their experience. Investigate; get the *facts*.

Drop us a line to-day for our agency proposition and catalog.

**Reliable Dayton Motor Car Co.**
**Dept. 6 Chicago, Ill.**

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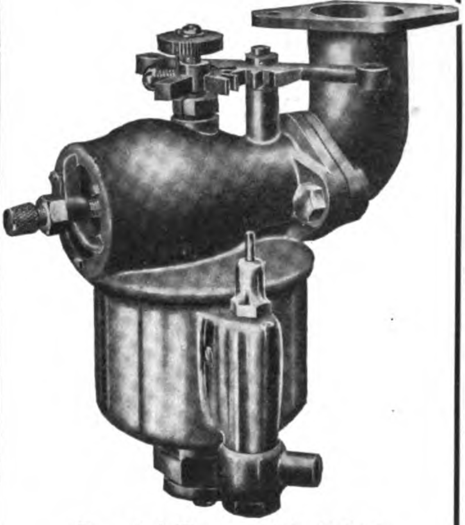
# BUICK TYPE



## Special Types, Model C

These special types of our Model C are giving the best of results; some have used four different makes before trying ours, and are now getting results never obtained before.

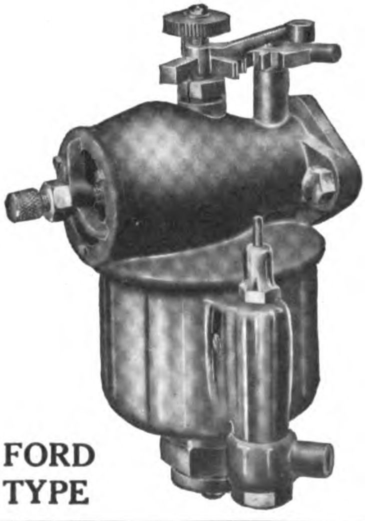
They give the maximum power on hills, or racing, fine throttle control, easy starting, and save gasoline.

Guaranteed to give satisfaction, or price refunded.

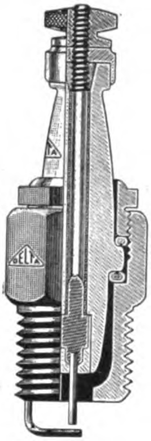
| | |
|---|---|
| LIST—BUICK 10 | $14.75 |
| FORD, S, N, R, T, | 14.00 |

*Liberal Discount. New Catalog Ready.*

**Heitger Carbureter Co., 203 W. S. St.**
INDIANAPOLIS, IND.



FORD
TYPE

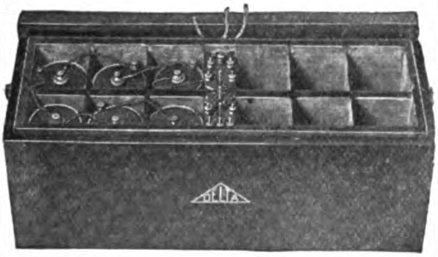


## SPARK PLUGS

Porcelain and mica; in all standard threads; packed in damage proof round metal end cartons.

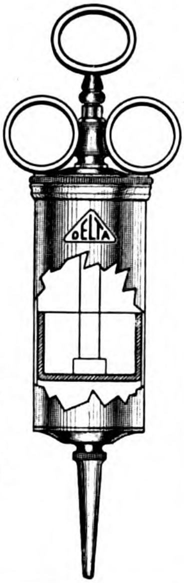
## BATTERY BOXES

Patent partitioned multiple switch boxes, for eight, ten or twelve cells.



## OIL GUNS

All metal, solid ground-to-fit pistons, oil and combination grease guns, in four styles and nine sizes.



## DRY BATTERIES

30 Ampere ignition batteries, with a new-idea square carton that prevents shifting of cells.

## DELTA MFG. CO.

Bloomfield, - New Jersey

---

# MONEY WILL STRETCH

**At least it will go further if spent in the right place. 50 PER CENT SAVED BY OUR BIG OFFERS. We can stretch your money and save you a full 50 per cent**

**LOOK! Here are the most remarkable Magazine Clubs ever offered**

## SPECIAL OFFERS

| | Regular Price per Year | Our Price |
|---|---|---|
| Metropolitan | $1.50 | $1.50 |
| Pearson's | 1.50 | |
| Total | $3.00 | |

| | Regular Price per Year | Our Price |
|---|---|---|
| Pearson's | $1.50 | $1.50 |
| Paris Modes | .50 | |
| Woman's National Daily | 1.00 | |
| Total | $3.00 | |

Metropolitan, Sunset or Bohemian can be substituted for Pearson's in this club.

| | Regular Price per Year | Our Price |
|---|---|---|
| Woman's National Daily | $1.00 | $1.00 |
| Paris Modes | .50 | |
| National Home Journal | .50 | |
| Total | $2.00 | |

| | Regular Price per Year | Our Price |
|---|---|---|
| Outing | $3.00 | $2.25 |
| Sunset | 1.50 | |
| Total | $4.50 | |

| | Regular Price per Year | Our Price |
|---|---|---|
| Pearson's | $1.50 | $3.00 |
| Metropolitan | 1.50 | |
| Sunset | 1.50 | |
| Bohemian | 1.50 | |
| Total | $6.00 | |

Outing or Smart Set can be included in any of above clubs at $1.50.

Any two $1.50 Magazines in above clubs will be sent to one or different addresses for only $1.50.

| | Regular Price per Year | Our Price |
|---|---|---|
| National Home Journal | $ .50 | 50c. |
| Paris Modes | .50 | |
| Total | $1.00 | |

| | |
|---|---|
| Paris Modes | 50c |
| National Home Journal | 50c |

and your choice of Pearson's, Metropolitan, Bohemian or Sunset, to one or more addresses for one year, only $1.50.

## Big Bargain Prices on Single Yearly Subscriptions

| | Regular Price | Our Price |
|---|---|---|
| Outing | $3.00 | $1.50 |
| Bohemian | 1.50 | .75 |
| Pearson's | 1.50 | .75 |
| Smart Set | 3.00 | 2.50 |
| Paris Modes | .50 | .25 |
| National Home Journal | .50 | .25 |
| Woman's National Daily | 1.00 | .60 |

These offers are good to old as well as new subscribers.

REFERENCES: North Memphis Savings Bank, Memphis; or any business house in Memphis, or any Magazine in our clubs.

Send all orders direct to the

**JONES BROTHERS COMPANY**
600-606 Goodwyn Institute, Dept. 75, Memphis, Tenn.

Send for our large Price List. It is Free to any address.

# ROPER Safety Propeller

# YOU Can Have One for YOUR Boat

In every kind of try-out the Roper Safety Propeller has been

## A Triumphant Success

We are preparing to manufacture these propellers for 1909 in larger quantities than ever, so that we can sell them at reduced prices and on easy terms. We believe that every boatman who knows anything about the Roper Safety Propeller will want one for his own boat, and we are going to make it easy for him to buy one.

## Here is Our Special Offer

We will send a Roper Safety Propeller, freight prepaid, anywhere in the United States to any person sending us a request and giving us satisfactory references, and let him use it for thirty days on his own boat free of charge, with the agreement that if it shall fail to perform as represented and guaranteed by us, he can return it at our expense and without having to pay us so much as one dollar; but also with the agreement that if he finds it to be entirely satisfactory he is then to pay us for it in cash or by draft, certified check or money order, when it is to become his property.

## Thirty Days' Free Trial on Your Own Boat

Remember, we deliver it, freight prepaid, anywhere in the United States. At the end of the thirty days, if it is satisfactory you pay for it and keep it. If it is not satisfactory, you return it to us and we pay the freight. It is all left for you to decide, after giving it the thirty days' trial on your own boat.

We **take all the risk** because we can **afford** to take it. We **know** that this propeller is so much superior to every other for use on motor boats that once you have tried it out for yourself on your own boat you would not part with it for double the price if you could not obtain another.

It is not only the **best** but also the most reliable and dependable propeller ever used on a motor boat.

If it **is** the best you want it. If it were not the best we could not afford to take the risk of selling it on any such terms as the above.

To avoid delay, please write to us **immediately**, stating in detail just what your needs are, and giving style and size of your boat, power and make of engine, distance from engine shaft to outside of stern post, and any other information you desire us to have, and we will send you the kind of outfit you require; and all on the above terms.

**C. F. Roper & Co.**
**Hopedale, Mass.**

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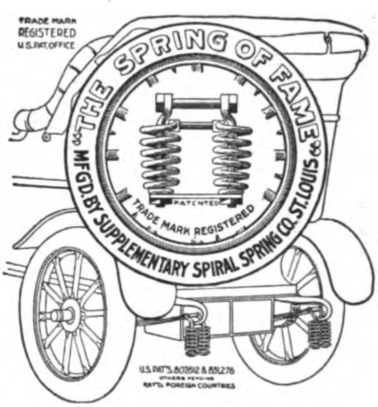


# YOU CAN'T BUY

**Better Shock Absorbers Than**

# Supplementary Spiral Springs

**Because There Aren't Any Better]**

¶ It is the greatest device in the world for saving your car. Over 15,000 cars are equipped with these springs, and we have letters from users in all parts of the world testifying to their satisfactory qualities.

**You run no Risk in Specifying**

# Supplementary Springs

**Supplementary Spiral Spring Co., Inc.**
**4522 Delmar Ave., St. Louis, Mo.**

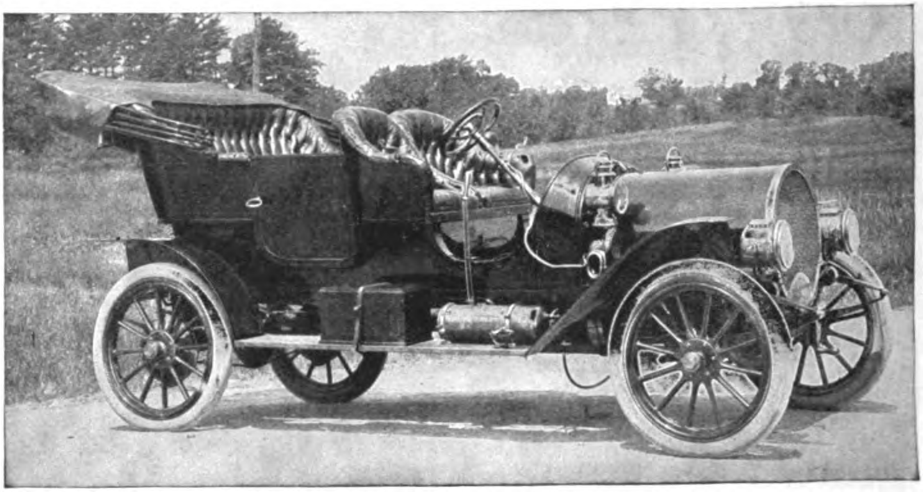
**BRANCHES:**
**New York, 1876 Broadway, Motor Mart Bldg.**
**Boston, 889 Boylston St.**
**Chicago, 1218 Michigan Ave.**
**Pacific Coast, 424 Stanyan St., San Francisco.**

**Pickard**
MANUFACTURERS

**FOUR MODELS**

| | |
|---|---|
| 5-passenger Touring Car | $1500 |
| 4-passenger Touring Car | 1450 |
| 3-passenger Roadster | 1400 |
| 2-passenger Runabout | 1400 |

**PICKARD CARS** are practical cars for practical people. They are simple in construction, free from delicate mechanical devices and economical in both fuel and oil consumption. They are thoroughly up to date and have a full equipment of clock, speedometer, robe rail, foot rail, two gas lamps, generator, three oil lamps, a horn, and two large tool boxes.

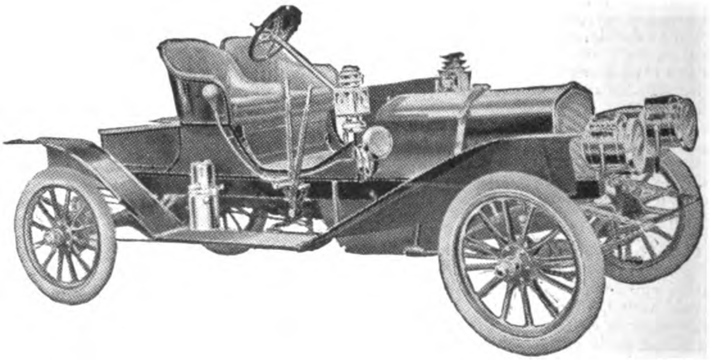


THE PICKARD is a big money-maker for Agents. Write for our interesting proposition.

**PICKARD BROS., Brockton, Mass.**

**MIDDLEBY**

**$850.00 RUNABOUT**

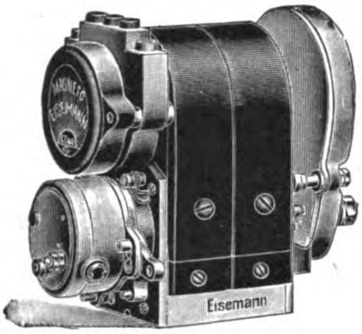


Four cylinder, four cycle, 4″ bore and stroke, air cooled, three speeds forward and one reverse, slide gear transmission, shaft drive, 108″ wheel base, 30 x 3½ inch tires, complete with two gas lamps and generator, two side oil lamps and one rear lamp, French horn, tube and tools.

**Agents write for territory and catalogue**

**MIDDLEBY AUTO COMPANY, Reading, Pa.**

# EISEMANN MAGNETO



The **EISEMANN MAGNETOS** have reached the highest degree of perfection, outclassing all competitors.

You can run your motor at slower and at higher speed on the **EISEMANN MAGNETO** than any other and with an absolute certainty of a full development of the possibilities of your motor. The **EISEMANN** requires practically no attention and is always ready to give you the very best results.

**SEE US AT THE SHOWS**

**NEW YORK & CHICAGO**

An examination of the records will show that the **EISEMANN** was equipped upon the winners of the principal motor racing events of the last three years.

You can not make a mistake if you equip with **EISEMANN.**

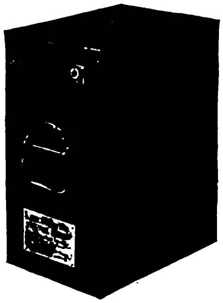
Various models for any and all kinds and sizes of motors.

Give us the specifications of your motor and we will advise you just what you need.

**LAVALETTE & COMPANY**

**112 West 42d Street - - New York City**

# NORTHWESTERN



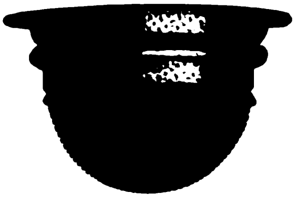
Ignition
Batteries
and Electric
Lamps

FOR

Automobiles
and
Motor Boats

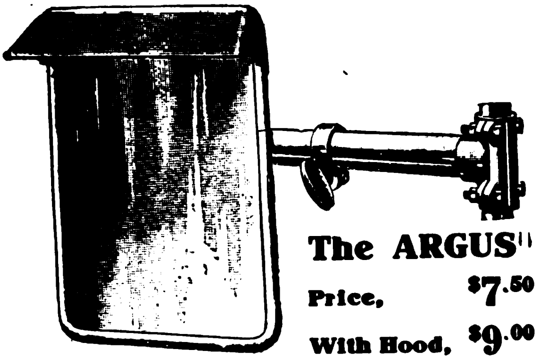
**FULLY GUARANTEED**

*Write for Catalogue A*



**Northwestern Storage Battery Company**

**140 MASON STREET, MILWAUKEE, WIS.**



**The ARGUS**

**Price, $7.50**

**With Hood, $9.00**

# CRASH BANG!!!

**And your new touring car is a wreck**

## 'T Wasn't Your Fault!!

No, you drove carefully enough, but the man behind smashed into you

## THE ARGUS MIRROR

Adjustable to any angle, on your dash would have saved your car, for with it

**YOU CAN SEE THE ROAD BEHIND**

**Motor Car Equipment Co.** 55 Warren Street
1727 Broadway **New York**

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# Matheson

## 1909 Prices Reduced $1,000

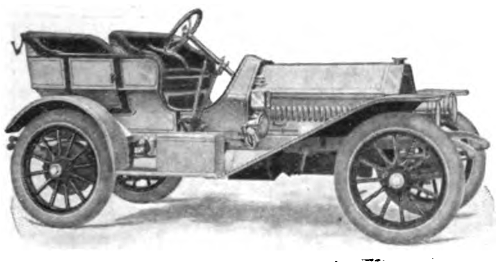
HERETOFORE the Matheson Car has been considered the highest-priced as well as the highest-grade American car on the market. ¶ Millions of dollars' worth of these cars have been delivered to customers who could afford to pay the higher price for the **best.** ¶ In order to sell hereafter this highest of all high-grade cars at the prices of the cheaper cars, we have **increased our working capital by $350,000** and will **double our factory output.** The quality remains the same. The only change is in the price, and this enormous reduction in our price now places the **Matheson Car** within the reach of everyone wishing to make sure of getting America's truly **best car.** Send for our book of customers' letters telling of the experiences of the most prominent men of affairs in this country with their **Matheson Cars,** covering thousands of miles of service everywhere.

| | NEW PRICE | FORMER PRICE |
|---|---|---|
| **50 H. P.** 1909 TOURING CAR | $4,500 | $5,500 |
| **50 H. P.** 1909 ROADSTER | 4,350 | 5,000 |
| **50 H. P.** 1909 RUNABOUT | 4,350 | 5,000 |
| **50 H. P.** LIMOUSINE | 5,500 | 6,500 |
| **50 H. P.** 1909 LANDAULET | 5,500 | 6,500 |

## MATHESON AUTOMOBILE CO.

**MAIN SALES OFFICE, 1886-1888 BROADWAY - - - - - - - - - - NEW YORK CITY**

**Dealers Wanted in all Open Territory**



Model "R" Roadster

# Glide

## $2000

## This 45-H.-P. Car Sells for $2000 and Represents $2000 of Automobile Value

THE GLIDE is not the type of car advertised to revolutionize the automobile industry, because it could not be as good as it is and sell at revolutionary prices. It is a standard American car—sold at a standard price—a price fixed at the point of safety.

—The price is sufficient to insure the use of the best design, material and labor—necessary in the production of a satisfactory car.

—The profit is not excessive and the car represents a full $2,500 of automobile value.

—Not because of its reputation, but because of the points brought out in a demonstration, the Glide interests both buyer and agent.

—There is no car built—sold at any price—which has more worthy features nor points more easily demonstrated.

—The machine that gives you good service must be built from the ground up, every feature incorporated as a part of the trustworthy whole. It can never be a mere skeleton of old design with frills added for selling and advertising purposes.

—The features of the Glide are revolutionary only when the price is considered. They are built in; made an integral part of the car. And none of these features are found in the very low-priced cars, and but few in the very high-priced cars.

**Glide Model "G" Special Touring Car, seats 7; wheel base 120 inches; 34 x 4½-inch tires—$2,500.**

### We Want Every Buyer and Every Agent To Read These Specifications

—The power plant is a 4-cylinder (cast separately) 45 (actual not theoretical) H. P. *Rutenber* engine. This is a grade *never found* in the widely heralded *low-priced* cars. The *price alone* makes it *possible* in the Glide.

—An improved form selective type of transmission which *absolutely eliminates jerks* when *starting* and *jolts* when *stopping*.

—A bevel driving gear of *ample* size—held always in *mesh* by *its own special bearings*. Vanadium steel springs which *do away* with the need of *shock absorbers*.

—A double-hinged hood—power plant instantly accessible.

—An *improved* type of multiple disc clutch that *cannot* get *out of order*. A lubricating system which is *positive*—requiring *no* attention.

—A *double* set of brakes—*distinct* from the axle—internal expanding and external contracting—will hold car on any grade.

**—36 x 4 tires Wheel base 106 in. Write today for catalog.**

**Special Notice to Agents.** We are prepared to make a special proposition to live, progressive dealers for certain unoccupied territory, from which we have received a great number of inquiries. If you will write us today, we will be glad to take the matter up with you at once. This is an exceptional opportunity. Don't consider it as anything else. If you are in a position to handle the Glide, we can show you how this can be made very profitable.

**The Bartholomew Co.,** Standard Manufacturers A. M. C. M. A. **210 Glide St., Peoria, Ill**

---

Do not think that your proposition is too difficult for

# ELECTRIC WELDING

as we have made many seemingly impossibilities possible and yours may be no exception.

Our equipment for doing this work is unequaled.

If you have not already profited by our experiences, it has been no fault of ours, as we are always ready and willing to give you valuable information.

**WE SOLICIT YOUR INQUIRIES**

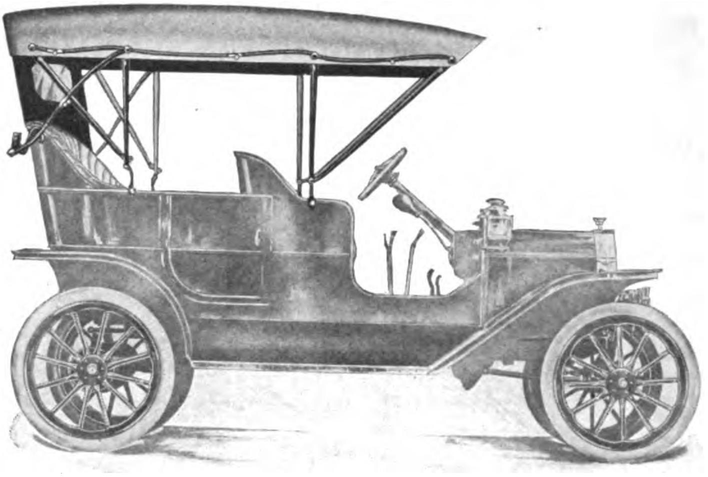
**SEE OUR DISPLAY AT SPACE NO. 124, GRAND CENTRAL PALACE SHOW AND NO. 163, THE MADISON SQUARE GARDEN SHOW**

## The STANDARD WELDING CO.

**CLEVELAND**

# TOPS TOPS TOPS

**For Ford, Maxwell, Buick, Chalmers-Detroit, E. M. F.**
**(Made in all materials, in all ways)**



## W. H. NEWTON & SON

**123 Elm Street :: :: CORTLAND, N. Y.**

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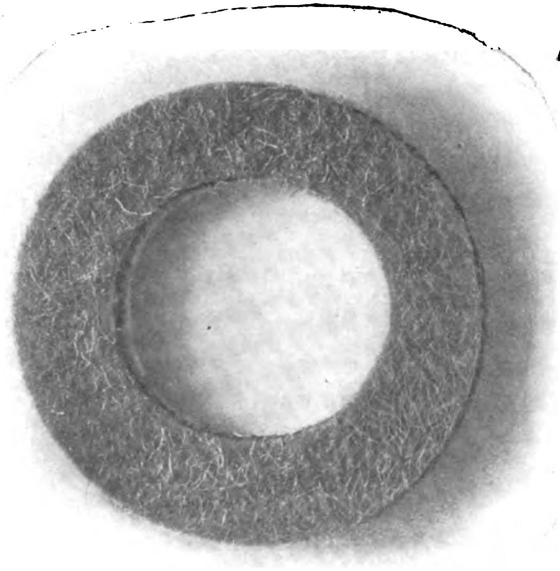
# FELT PACKINGS



FOR
**Automobiles**
MY SPECIALTY

Dust Rings for the Hubs. Strips for Crank Cases. Washers for all Lubricating and Dust Excluding Purposes.

*Please write for Prices and Give Dimensions*

Prompt Shipment of all Orders is Assured.

**No Order too Small to Receive Careful and Prompt Attention.**

**N. E. BOOTH,** 743-45 39th Street, Brooklyn, N. Y.

# Raybestos

## FRICTION FACING FOR AUTOMOBILE BRAKES AND CLUTCHES

Raybestos is a composite asbestos and copper wire fabric made up on one integral part which permits of its being circular stamped out for clutches and cones without disintegration occurring.

Raybestos is heat proof, oil proof, water proof, weather proof (almost wear proof).

Raybestos is absolutely the only lining on the market creating friction greater than metal to metal and making sure a quick and easy stop on the steepest grade.

**ROYAL EQUIPMENT COMPANY**

151 Housatonic Avenue BRIDGEPORT, CONN.

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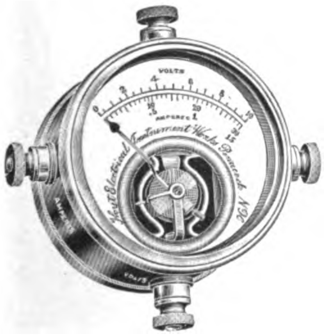
## THREE INSTRUMENTS IN ONE


VOLTS
Hoyt Electrical Instrument Works Penacook N.H.

**THE HOYT TRIUNE VOLTAMMETER** is designed expressly for that class of buyers who believe in obtaining the best first, and who are willing to pay a fair price for an accurate instrument. The moving parts rest in highly polished jewel bearings. It is exceedingly dead beat in action, and yet so sensitive it will indicate 1-50 of an ampere.

The instrument is furnished in a morocco-bound, plush-lined case, having a separate compartment for a pair of silk-covered cables, which accompany it. Size of case 4″ x 3¼″ x 2″. This is a new departure in pocket measuring instruments. It is very small, compact and complete. Obtainable from any progressive dealer catering to high-class trade, or will be sent express prepaid upon receipt of $12.00.

*ASK FOR BULLETIN T. J.*

**Hoyt Electrical Instrument Works**

PENACOOK : : : : NEW HAMPSHIRE

# Prest-O-Lite Gas Tanks

are used by almost all experienced motorists. Refilled tanks can be obtained almost anywhere in the United States or Canada.

The dealer or garage that isn't furnishing them to customers is helping his competitor, and losing enough money to pay a good slice of his total expenses.

# Prest-O-Carbon Remover

This preparation does the work. Removes all the carbon from pistons, cylinders, piston rings and valves. Don't send your customers elsewhere for it

You can clean your customer's engine quickly, charge $2 or $3, make a hit with him, and a good profit. Get after this!

## The Prest-O-Lite Company

*Write the Nearest Main Station*

New York, 1904 Broadway Boston, 607 Boylston St.
Indianapolis, 228 E. South St.
San Francisco, 520 Van Ness Ave. Toronto, 6 King St. W.
Philadelphia, Race and Carlisle Streets

**2500 Exchange Agents**

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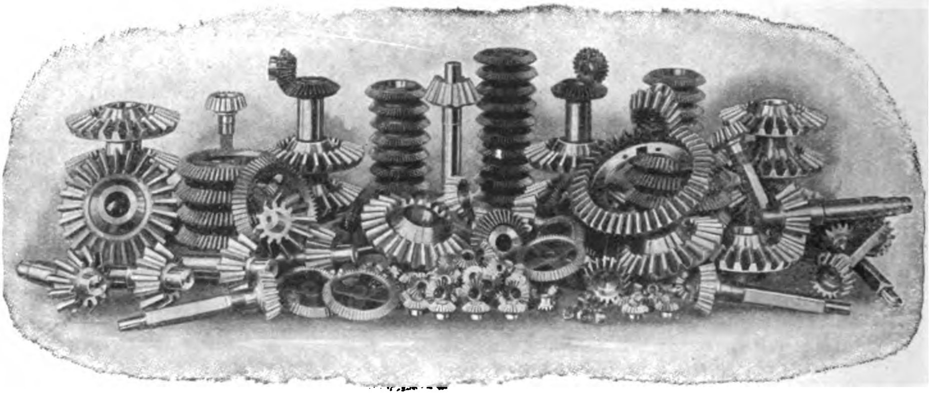
# Do You Want Noiseless Running Gears?

**If so, have them manufactured by a firm that will stand back of what they guarantee.**



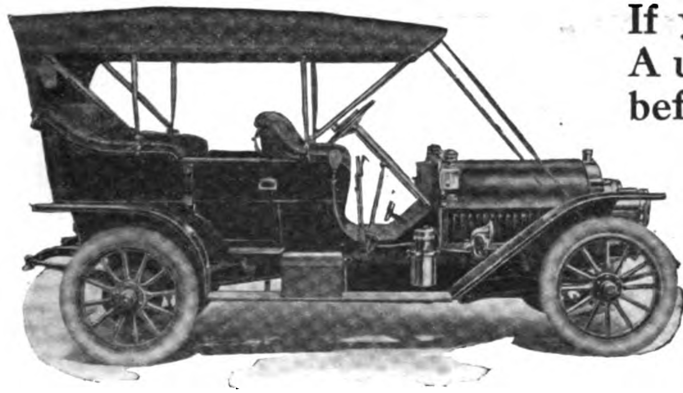
With our twelve years of manufacturing and finishing complete Gears of all descriptions, we have found the secret note for Automobile Manufacturers. Therefore we have equipped a plant to meet their requirements. With our modern ma hinery, our skilled mechanics, we are ready to solicit orders for all kinds of gearing, from the raw material to the finished product.

Hardening of all kinds especially guaranteed under specifications.

Transmissions and Differentials made complete to order.

Allow us an opportunity to quote you prices to meet your requirements.

**THE VAN DORN & DUTTON CO., Cleveland, O.**



No other manufacturer is willing to give so much at such a modest price. From the radiator to the rear axle, inch by inch, part by part, will be found the best material that money can buy or experience can produce.

## The 1909 Speedwell

**Price, $2,500**

Fully equipped, 40-45 Horse Power. Four individual cylinders. 120-inch Wheel Base, 56-inch tread.

## If you order any Automobile before you look at the Speedwell, you make a mistake

Not because WE say so, but because the Speedwell is such extraordinary value for the money that you cannot afford to miss such an opportunity It is a big, broad, roomy, comfortable car, so exquisitely finished that no other car at any price near it, excels this car in appearance. In construction, few other cars equal it and those that do, sell for a thousand to two thousand dollars more

**THE SPEEDWELL MOTOR CAR CO.**
**DAYTON, OHIO**

Exhibiting at the New York and Chicago Shows. GOOD agents who can handle a GOOD car can secure GOOD territories

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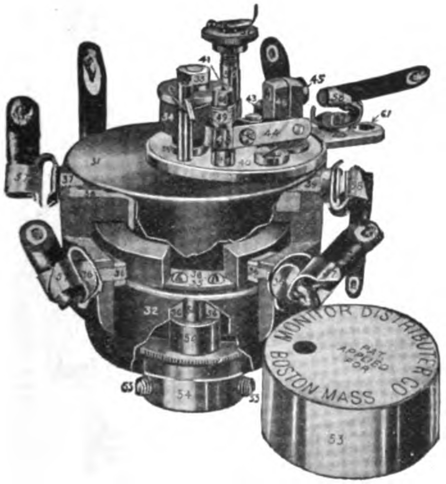
## Monitor Distributer


MONITOR DISTRIBUTER CO.
PAT. APPLIED FOR
BOSTON, MASS

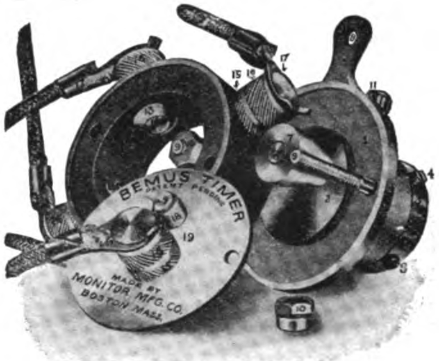
COMPACT, EASY TO TAKE APART—MOST DURABLE, ACCURATE, EFFICIENT

Send for Booklet, 1909 Prices

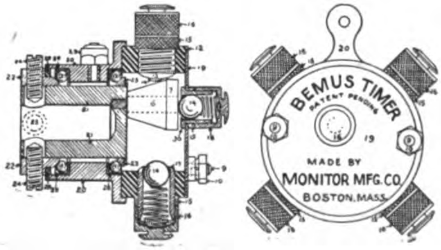
**Monitor Manufacturing Company**
6 Pelham Street, Boston, Mass.

ALL PERFECT

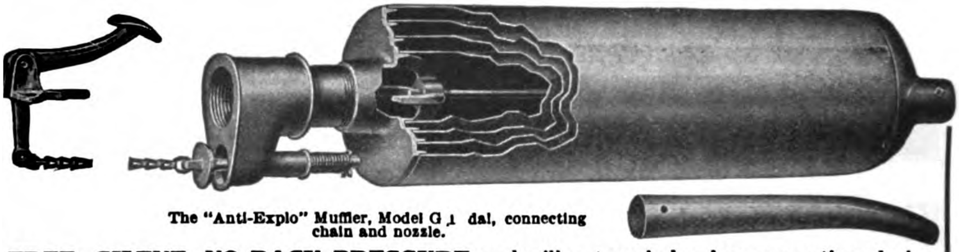
## BEMUS TIMER


BEMUS TIMER
PATENT PENDING
MADE BY
MONITOR MFG. CO.
BOSTON, MASS.

## Ball Bearing Timer

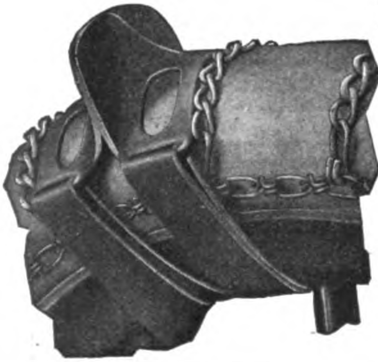

BEMUS TIMER
PATENT PENDING
MADE BY
MONITOR MFG. CO.
BOSTON, MASS.

# The "Anti-Explo" Muffler



The "Anti-Explo" Muffler, Model G, pedal, connecting chain and nozzle.

**FREE, SILENT, NO BACK PRESSURE** and will not explode when our anti-explosion valve or muffler cut-out is used, as this valve relieves the pressure before it reaches the muffler. A trial will prove that this muffler is superior to any other on the market.

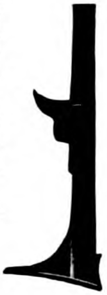


## EMERGENCY MUD HOOK for Pneumatic Tires

One on each wheel we guarantee will get you out of the mud, sand, or snow where everything else fails. You can dispense with chains if you carry a set or two of these. They are malleable iron, weigh 5 lbs per set, and will fit any size tire from 3½ to 6 inches. Prices, per pair, with straps, $2.50; without straps, $1.50.

## LITTLE GIANT STORAGE JACKS

Best on the market. Light, strong and quickly adjusted to any size or style of wheel or axle. Price, per set of four, $3.00.



**GARAGE EQUIPMENT CO.**
Milwaukee, Wis.

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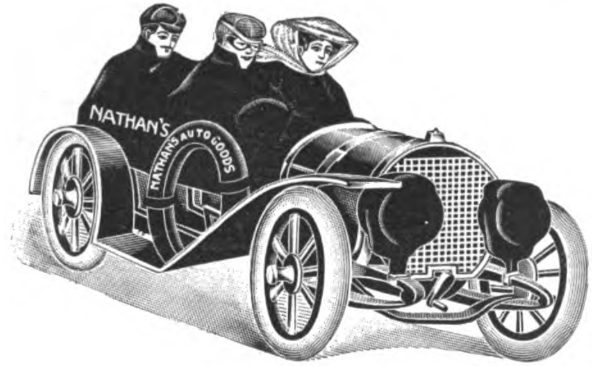
# NATHAN'S Auto Fabric Supplies Are "The Standard"

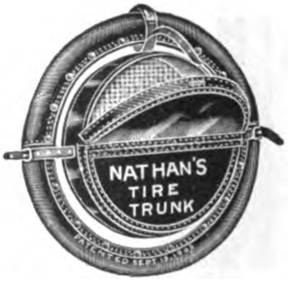


## NATHAN'S "RUMBLE" STORM COVER

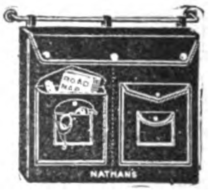
**for cars with rumble seat. It tapers back to form a neat cape to cover occupant of rumble seat.**

**Everything made of Fabric for the Auto**

**SEE US AT N. Y. AUTO SHOW**

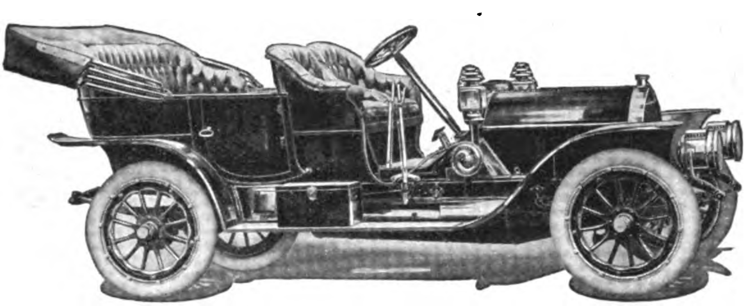


NATHAN'S Improved Tire Trunk



NATHAN'S Coat Rail Bag

**Nathan Novelty Manufacturing Company, 84 to 90 Reade Street, New York City**



**Model "O" Touring Car, Price $3000**

**KNOX COMPLETENESS**

In 1909 Knox Models "O" and "M" we offer the complete cars at their selling prices. Not only in the sense that the purchase price covers full equipment, such as top, side curtains, storm front, all lamps, tire cover, tire irons, tools, magneto, with two sets of spark plugs and two complete systems of ignition; also FISK TIRES and DEMOUNTABLE RIMS.

Knox Models also include the very latest and most up-to-date ideas of automobile engineering, and every detail, as well as the quality of material and workmanship, have been given the most careful attention with the result that the word "completeness" is applied to Knox 1909 models in its broadest meaning.

The average maker will charge as follows: Magneto extra, $200; Top, $150; tire irons, $10; extra for Fisk Demountable tires and rims, $60; extra for nickel trimmings included on 1909 Knox Models, $150. Total $570.

We have fully demonstrated their ability and staying qualities in contests of 1908, and we now wish to prove that they are the best value ever offered by any maker. *Send for Catalogue "B."*

**We will Exhibit at Madison Square Garden, Space 1, and the Chicago Show.**

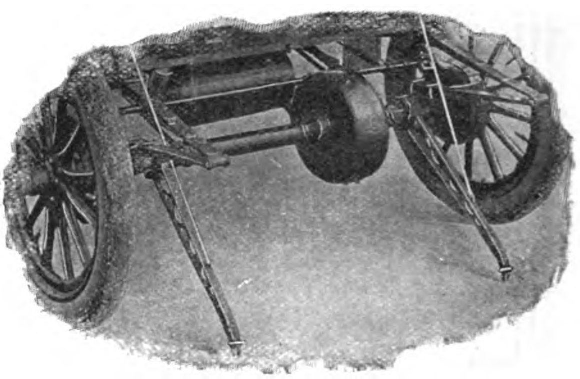
**KNOX AUTOMOBILE CO., Springfield, Mass.**
Member A. L. A. M.

To the Knowing Dealer:

**The virtue that men appreciate most is promptness. Explanation after disappointment is almost equivalent to insult. If you want to be sure of all your promises, try our instant service. Anything not in stock will be wired to you from the factory the hour we get your order.**

The Autolight & Motor Supply Company, Inc.
PAUL P. RIPPIEN, General Manager,
Broad and Spring Garden Streets, Philadelphia

# "PERFECT" BRAND AUTOMOBILE SPECIALTIES



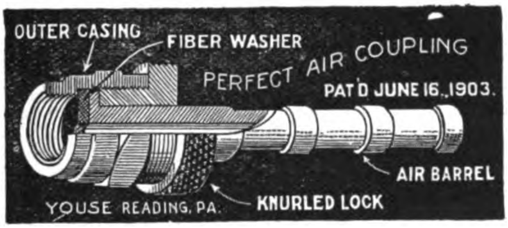
**PERFECT DROP BRAKES**—A simple and inexpensive but reliable device to prevent a car going backward down hill should the brakes fail to hold. Insurance at nominal cost. Price, $4.00 per pair for 28", 30" and 32" wheels.
$5.00 per pair for 34" and 36" wheels.

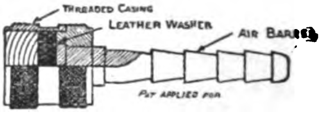
**Write for Trade Discounts.**

**PERFECT AIR COUPLING—Absolutely air-tight, at any pressure, practically indestructible. Nothing quite so disturbing as to find the coupling leaking so that the desired pressure cannot be gotten.**

**Retail price, 25c. each.**

**Special Prices on Quantities.**





Perfect Jr. Air Coupling, Youse, Reading, Pa.

**PERFECT AIR COUPLING Jr.** Smaller and lighter than the Perfect, but wholly reliable. A desirable coupling, and inexpensive. Each and every one guaranteed. Retail price, 15c. each. **Special Price on Quantities.**

**Cuts furnished gratis to Jobbers who may wish to Catalog any of the above.**

**LIBERAL DISCOUNTS TO THE TRADE**

**A Special Proposition to Pump Manufacturers on Couplings in quantities.**

**Manufactured by E. S. YOUSE, 45 N. 5th Street, Reading, Pa.**

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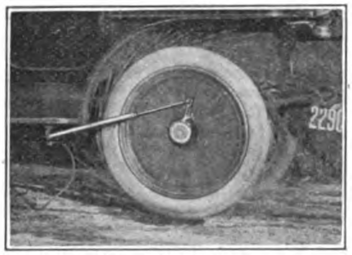
# LET YOUR CAR DO THE WORK



THE PUMP IN DETAIL

**WITH**

## The RUNG AUTOMATIC TIRE PUMP

You can inflate your automobile tire in less than two minutes, through the car's own power. Can be operated at any speed. Isn't this an improvement over the use of a hand pump?

## OUR GUARANTY

If the pump does not do all that we claim for it, return it within thirty days and your money will be refunded. Write for illustrated booklet.

**THE RUNG AUTOMATIC TIRE PUMP CO.**
**200 Girard Trust Bldg., Philadelphia, Pa.**
**SKINNER & SKINNER, Chicago, Western Distributors**

# OILDAG

Is the very best lubricant for Automobiles, Motor Boats and wherever a gas engine is the source of power.

**OILDAG REDUCES FRICTION**
**INCREASES COMPRESSION**
**GIVES INCREASED POWER**
**REDUCES OIL CONSUMPTION**

Its use means **Better Results at less cost** than when any other lubricant is used. No other lubricant is so meritorious. It

## Makes Gas Engines Run Like Velvet

Oildag is Deflocculated Unctuous Acheson-Graphite in oil. It is put up in tubes and cans containing sufficient to charge a specified quantity of mineral oil.

One Packard "30" has run over 740 miles on a single gallon of Oildag. Booklet "C" tells all about Oildag. Write for it.

## ACHESON OILDAG COMPANY

NIAGARA FALLS, N. Y., U. S. A.

---

# OUR GRAPHITE GREASES

Are made by blending very pure, thoroughly amorphous, soft, unctuous Acheson-Graphite with a high-grade grease, the latter to serve as a carrier for the unctuous graphite, which is, in itself, **a True Lubricant.** They are intended **for Gear, Cup** and **Ball Bearing use,** and because of the high purity and Superior Lubricating Qualities of the Acheson-Graphite incorporated with the grease will do more work and afford better lubrication than any other grease. Write for Folder 273.

# ACHESON-GRAPHITE, GRADE "1340"

This is a very fine, soft, unctuous powder. It is **an Electric Furnace product** and

## Guaranteed at Least 99 Per Cent. Pure

There is no other graphite in the world like it. All who have use for a powdered graphite for lubricating purposes should use our Grade "1340." Folder 279 tells all about it.

## International Acheson Graphite Company

PORTAGE ROAD, NIAGARA FALLS, N.Y., U.S.A

# BLUE RIBBON

BLUE RIBBON
CREAM
METAL POLISH
FOR
CLEANING & POLISHING ALL METALS

## THE 20TH CENTURY AUTO POLISH

**Outshines and Outlasts Them All**

The Only Practical and Economical Polish Made for Garage Use, in 5 and 10 Gallon Cans—Does Not Settle

A THICK OIL CREAM POLISH

**Ask Your Dealer or Write for Sample**

INTERNATIONAL METAL POLISH CO.
2142 Capitol Ave., North Indianapolis, Ind.

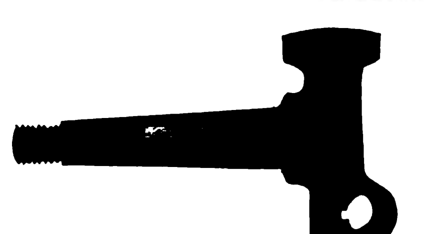
**Distributors and Jobbers**

Chicago—B. P. McAlees, 352 LaSalle Ave.
Cleveland—H. F. Reid, 1718 Crawford Rd
Indianapolis—H. T. Hearsey Vehicle Co.
" Willis-Haywood-Holcomb Co.
Minneapolis—Williams-Gallagher Co.
" Northwestern Auto Co.
" Fawkes Auto Co.
Omaha—Powell Automobile Co.
Peoria—M. M. Baker & Co.
St. Louis—Neustadt Auto & Supply Co.
St. Paul—C. J. Smith & Co
" C. P. Joy Auto Co.
Toledo—Union Supply Co.
Pittsburgh—Jos. Woodwell Co.
" Pittsburg Auto Tire Repair Co.

# GILL FORGED

# CRANK-SHAFTS

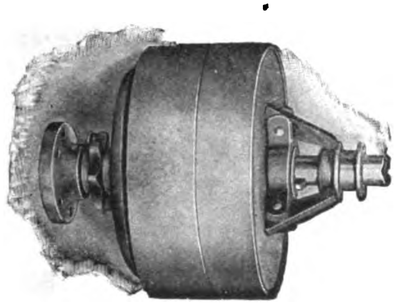
**The P. H. Gill & Sons Forge and Machine Works, Lorraine and Otsego Streets, Brooklyn, N. Y.** We wish to call the Trade's attention to our Chrome Nickel Steel Crank-Shafts and Gear Blanks, etc., Domestic and Foreign.

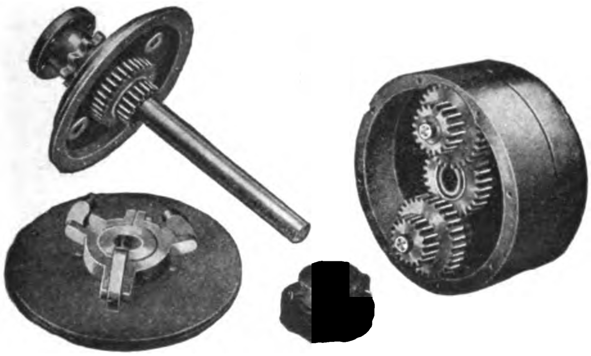


## NO DROP FORGINGS

We have special adapted Crank Pin Machines for making Crank-shafts true-round within one-quarter-thousandth of an inch. We also make axles complete, finished or forged only; also all kinds of automobile and marine forgings.

Crank-shafts up to 6" dia. All anvil-forged, hammered out of Acid O. H. Steel or Nickel Steel or Chrome Nickel Steel.





**Planetary Transmissions**

Manufactured Under
License from Patentee. (Ball Pat.)

**Two Speeds Forward and Reverse**

TWO SIZES { 12 to 20 Horse Power for Light Touring Cars and Roadsters
6 to 12 Horse Power for Buggyabouts and Light Runabouts }

*Send for Particulars
and Prices
in Quantities*

**We Build**

Gasoline Engines
Transmissions
Rear Axles
Steering Gears
*IN QUANTITIES*

**MICHIGAN AUTOMOBILE CO., Ltd., Kalamazoo, Michigan**

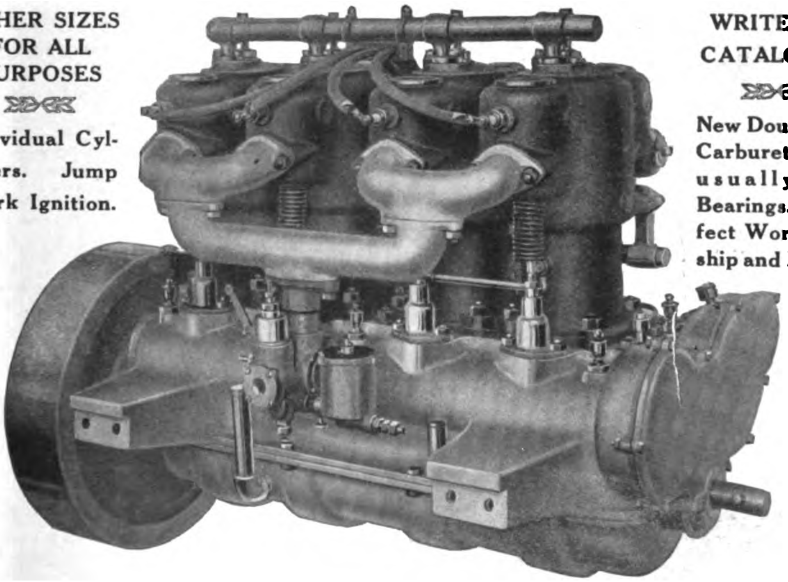
**SCHLOSSER MFG. CO. MOTORS**

OTHER SIZES
FOR ALL
PURPOSES

Individual Cylinders. Jump Spark Ignition.

WRITE FOR
CATALOGUE

New Double Jet Carbureter. Unusually Big Bearings. Perfect Workmanship and Finish



24-30 AUTOMOBILE TYPE. 4½ in. x 5 in.

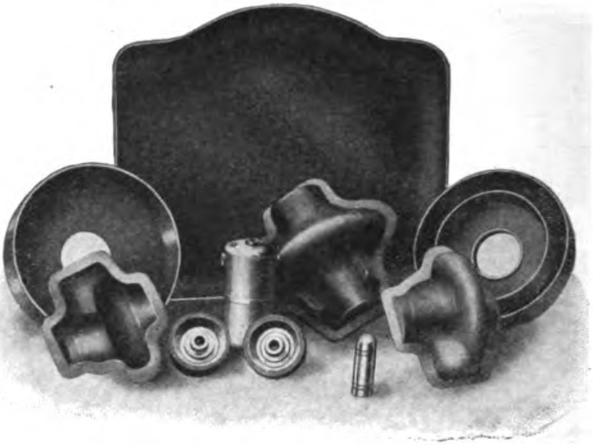
**Office & Factory: 151 E. 126th St., New York**

PRESSED STEEL INSTEAD OF CASTINGS

Transmission Cases

Engine Crank Cases

*Send Prints for Estimates*



Axle Housings & Covers

Brake Drums

We will exhibit as follows:—

GRAND CENTRAL PALACE, New York—Space 134
MADISON SQUARE GARDEN, New York—Space 205
COLISEUM, Chicago—Space 6

A. O. SMITH CO., 257 Clinton Street
MILWAUKEE, WIS.

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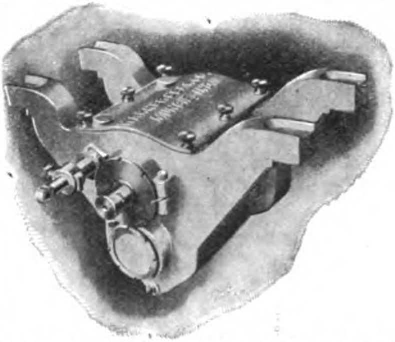
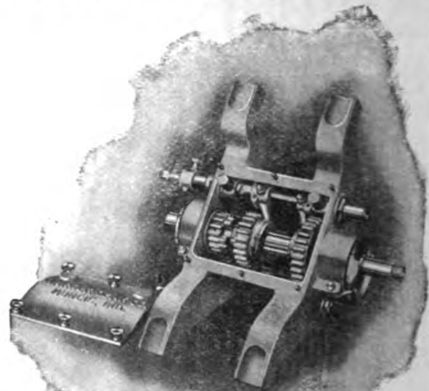
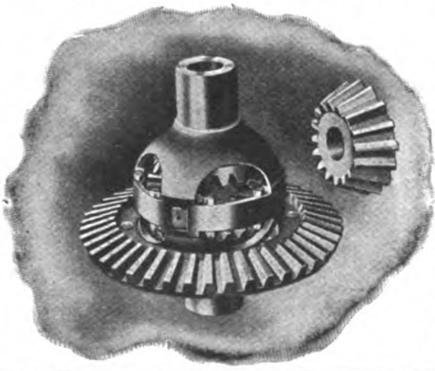
1909 TRANSMISSIONS AND PARTS



"SELECTIVE SLIDING"—35 and 50 H. P.





For Timken Roller Bearings and Annular Ball Bearings

Gears are made from **special Gear** forgings, hardened, ground and "treated." We also furnish "selective" control levers. We build both spur and bevel types of differentials. **OUR STEERING GEARS** are built to "stand up" under all conditions.

WARNER GEAR CO. :: :: MUNCIE, IND.

IT WILL PAY YOU TO INVESTIGATE

The 1909 National

The Line is Better and More Complete than Ever

**Model 9-35—4 cylinder, 4¾ x 4¾—5 Passenger Touring Car, $2750.00**
**Model 9-40—4 cylinder, 5 x 5 —7 Passenger Touring Car, $3700.00**
**Model 9-50—6 cylinder, 4½ x 4¾—7 Passenger Touring Car, $4200.00**
**Model 9-60—6 cylinder, 5 x 5 —7 Passenger Touring Car, $5000.00**

Each National has the well-known National Ball Bearing Motor, with new crank case oiler, two ignition systems (Bosch Magneto and battery) and all other tried and proven features of modern motor car construction.

Each of the above models can be furnished with body tonneau or as a Roadster.

Write for Distributer's Terms and Full Particulars

**NATIONAL MOTOR VEHICLE CO., 1003 East 22nd St., Indianapolis, Ind.**

SIMPLICITY ECONOMY RELIABILITY

Send for this book on ignition. Mailed Free.
Ask for book P.

Features of

J. & B. Coils and Ignition Specialties

New Type J Coils

ABSOLUTELY FOOL-PROOF

FREE TRIAL OFFER

¶ We will furnish samples for test to responsible parties. Send for our 30-day trial offer.

¶ A complete working Exhibit will be shown at the Boston Automobile Show, March 6th to 13th in Space 523, Department F, Mechanics Building.

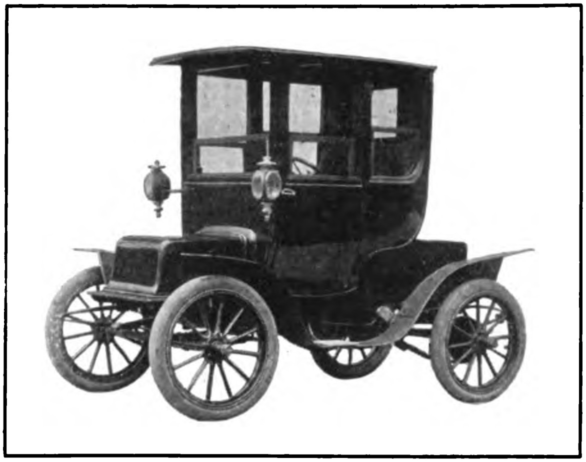
**Pettingell-Andrews Company**
BOSTON, MASS.

Exclusive Selling Agents for JACOBSON-BRANDOW COMPANY of Pittsfield, Mass.

GENERAL OFFICES AND WAREROOMS
Corner Pearl Street and Atlantic Avenue
Boston, Massachusetts

BRANCH OFFICE
327 Jefferson Avenue
Detroit, Michigan

# BABCOCK ELECTRICS



**are the PAR EXCELLENCE of electric carriage manufacture. They are luxury, elegance and economy combined. They are ideal for ALL members of the family and for all occasions. Let us prove to you that BABCOCKS are the greatest electrics. Send us your name.**

**BABCOCK ELECTRIC CARRIAGE CO. - Buffalo, N. Y.**

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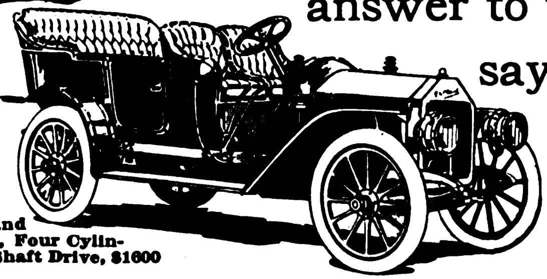
Oakland

# The OAKLAND is the answer to the man who says "Show Me"



**Oakland Forty, Four Cylinder, Shaft Drive, $1600**

It is a good, old-fashioned American habit, whether buying a cigar or a ten thousand dollar house, to look into things a little before spending your money and see that you are paying not one cent more than is necessary.

You select an automobile for what it is and for what it will do.

Of course some foolish people will continue to pay fancy prices for a maker's name.

But if we can show you a bigger, better automobile for $1600 than any other maker anywhere is producing, don't you think it part of wisdom to look into it before buying?

Why should you pay from 50 to 100 per cent. more for a car that will do no more than the Oakland "Forty"?

It has a forty horsepower motor with cylinders cast in pairs, 112-inch wheel base, seats five people without touching elbows, and in every little appointment is luxurious and easy-riding. Compare it with any high-priced car, and you will wonder how the other fellows ever get people to pay the long price for cars no better appointed than the Oakland.

Light weight, 2,000 lbs., means low cost of maintenance. Big 34-inch wheels, 4-inch tires, steel I-beam axles—nothing cheap about the Oakland—simplicity of construction and scientific manufacturing system alone can account for the phenomenally low price.

This is the car you want to buy, and if you are an agent it is the car you will want to sell, if we have open territory in your locality.

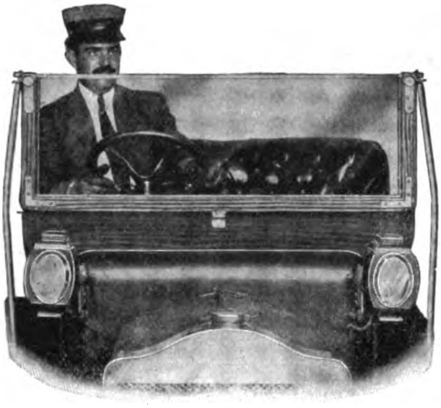
**OAKLAND MOTOR CAR CO.,** 208 OAKLAND AVE.,
PONTIAC, MICH.

**Member of the American Motor Car Manufacturers' Association**

**Will exhibit in New York only at Grand Central Palace Auto Show, opening December 31st.**

OUR 30 days' Special Offer on our New 1909 Pattern Folding Wind Shield. This is the biggest and best bargain ever offered by any Manufacturer in this line. Regular Retail Price $40.00. Our 30 days' Special Offer takes any style for $20.00 each, including our TAXI-CAB SPECIAL, TOURING CAR and RUNABOUT size.

## Cut Showing Shield Folded



## SPECIFICATIONS

| | |
|---|---|
| **FRAME** | Maple or Cherry with Mahogany finish, or Oak, with Golden finish. Bound around with a curved and overlapping brass moulding giving strength and rigidity. |
| **GLASS** | 3-16 Select French Plate polished. Set in felt pad in rabbet, secured by neat molding with brass screws. Glass is easily replaced in case of accidental breakage. Noiseless and non-vibrating. |
| **FITTINGS** | Solid cast brass, bright polished. No plating to wear off and show rust. Brass channels are very narrow and add to appearance of car. Adjustable and reversible. |
| **FINISH** | Four coats best elastic coach varnish. Hand rubbed and polished. Positively will not crack. |
| **LOCK** | Our new construction, Automatic snap lock. Quickly tightened or loosed with the hand. Shield can be raised or lowered by driver while car is in motion. No tools required. |
| **FREEBOARD** | Nine inch. Will fit any car, American or foreign. |
| **SHIELDS** | All shields are crated and F. O. B. cars, Indianapolis, Ind. |
| **TERMS** | If you are highly rated in Dun or Bradstreet Commercial Agencies then pay our bills net cash upon arrival of goods. When party is not rated then cash for full amount must accompany orders. |

## The Guarantee Tire & Bicycle Co.

**208-210 S. Illinois St., Indianapolis, Ind.**

**Manufacturers and Jobbers**

*Mention Trade Journal in Writing*

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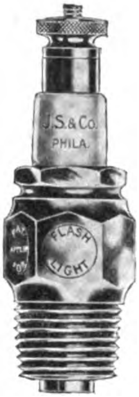
# ANY OLD PLUG



is good enough for any OLD PLUG OF A CAR. BUT MILEAGE INTERESTS the owners of high class Motors.

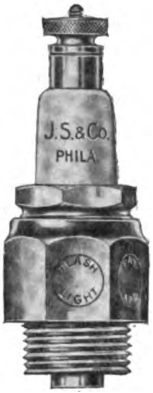
**Flash Light Plugs**

have given 15,000 miles without removing from the cylinders and were then ready for a trip around the world.

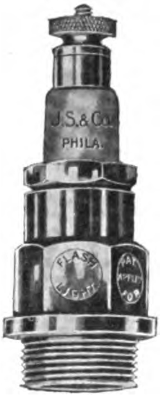
**Our Platinum Iridium Points**

cost us more than PURE GOLD, BUT the POINT is the

**FLASH LIGHT**



LIFE OF IT, and OURS LIVE LONGER than any other PLUG IN THE WORLD.



## NEW 1909 MODELS

½ in. STANDARD
METRIC
A. L. A. M.
⅞ x 18 in. THREAD
AND SPECIALS

**Get the Best in the World**

**Price, $1.50 Each**

## Janney, Steinmetz & Co.

**403 Market St., Philadelphia**

**WHEN YOU NEED A JACK
YOU NEED IT BADLY**

# THE STANDARD JACK

In its new form is more popular than ever before, if that be possible. This jack is one of the easiest selling accessories in any store. People have been taught to ask for it: years of advertising, its exhibition at the World's Fair at St. Louis and all the automobile shows—all tend to make it in fact, as well as in name

## The "Standard" Jack

Made in three sizes. Booklet and quotations for the asking.

*See our exhibit at Madison Square Garden and the Coliseum*

**COOK'S STANDARD TOOL CO.**
**Kalamazoo - - Michigan**

**Distributers:**
**BECKLEY-RALSTON Co., Chicago. THE MOTOR CAR EQUIPMENT CO., New York City. POST & LESTER CO., Hartford, Conn., and Boston, Mass.**

---

# THE ACME GUARANTEE

**Mr. Agent:**

A guarantee may mean much or little—a great deal depends on the guarantee and who makes it. The Acme Motor Car Company, after seven years of manufacturing honest automobiles ***unqualifiedly guarantees*** every Acme car. Not a guarantee with a loop-hole, but a broad one ***covering each car*** in ***every particular.*** Not a guarantee for a month or a year—but a ***perpetual guarantee during the life of each car,*** that we will replace any part which may break caused by either flaw in material or workmanship. Meet me at the Grand Central Palace Show and I will prove this statement and why we can do so.

**H. M. Sternbergh, Pres.**

**THE ACME
MOTOR CAR COMPANY
READING, PA.**

**BrowniekaR**

*"The Pioneer Juvenile Car"*

**BrowniekaR**

**Price, $175.00, F. O. B. factory**

The most popular, instructive and health-giving device ever placed in the hands of the younger generation.
A practical belt driven motor car capable of furnishing no end of amusement and instruction, containing as it does, all the elements of **a real motor car** that are necessary to a complete understanding of the modern automobile.
We have an interesting proposition for **the dealer.** Send for catalogue.

**OMAR MOTOR COMPANY, 31 Siegrist Street, Newark, New York**

**RUBBER GOGGLES**

**IN LARGE VARIETY**

**Cover Rubber Goggles**

**Patented July 30th, 1907**
**June 16th, 1908**

**Beware of Rubber Goggles not protected by COVER patents**

**FOR SALE BY ALL JOBBERS**

**SUSSFELD, LORSCH & COMPANY**
**37 and 39 MAIDEN LANE, NEW YORK**

**INFRINGEMENT NOTICE**

**Infringing Rubber Goggles are being imported into the United States, and dealers and others of the trade interested should know that these imported rubber goggles infringe the patents issued to H. S. Cover, South Bend, Ind., dated February 26, 1907; April 23, 1907; July 30, 1907, and June 16, 1908, which cover the whole goggle and particularly the constrictively held lenses; the elastic tubes in the outer ends of which the lenses are supported; the flesh pads about the eyes at the inner ends of said tubes; the re-enforcements at the ends of the flesh pads and between the eye tubes; and other features. It is the intention of the inventor to maintain his rights under these patents as is evidenced by the fact that he has begun suit in the United States Circuit Court for the Northern District of Illinois against The Beckley-Ralston Co.**

**FINAL DECREE entered in favor of these patents, Nov., 30, 1908, in the CIRCUIT COURT of the UNITED STATES, DISTRICT of INDIANA.**

**Signed, Harvey S. Cover, Patentee**

**TIRES! TIRES! TIRES!**

We can sell you any make, any size or style tire or tube for less money than any dealer anywhere in the United States.

We have contracts with the leading makers of automobile tires to sell for them any quantity of surplus stock enabling us to quote these at 60 to 70 per cent. discount from the regular price.

Do not buy tires until you get our prices. Bargains in all makes of tires and tubes.

**CLINCHERS DUNLOPS QUICK DETACHABLE**

We guarantee these brand new, clean, fresh 1908 stock. This lot includes Morgan & Wright, Ajax, Diamond, Continental, Ennis, Pennsylvania, etc. We are selling the lot while they last.

| Size. | Casings. | Innertubes. | Size. | Casings. | Innertubes. |
|---|---|---|---|---|---|
| 28 x 2½ | $7.00 | $2.50 | 34 x 3 | $9.25 | $3.50 |
| 28 x 3 | 11.00 | 3.00 | 34 x 3½ | 16.00 | 4.25 |
| 28 x 3½ | 15.00 | 3.50 | 34 x 4 | 22.50 | 5.75 |
| 30 x 2½ | 8.50 | 2.75 | 34 x 4½ | 23.50 | 7.50 |
| 30 x 3 | 12.25 | 3.50 | 34 x 5 | 23.00 | 6.50 |
| 30 x 3½ | 15.25 | 3.75 | 36 x 3½ | 13.25 | 4.25 |
| 30 x 4 | 18.50 | 5.25 | 36 x 4 | 21.50 | 6.25 |
| 32 x 3 | 10.50 | 3.25 | 36 x 4½ | 24.00 | 8.00 |
| 32 x 3½ | 16.00 | 4.00 | 36 x 5 | 23.75 | 8.25 |
| 32 x 4 | 20.00 | 5.50 | | | |

These prices are only good while our stock lasts, therefore place your order now to get the benefit of our low figures. TERMS are cash. At the very low price we are selling them, we are obliged to get cash with order. Do not hesitate to send us money. We are as safe as the bank. All C. O. D. orders must be accompanied with 10 per cent. of purchase, to cover us on transportation charges.

If you are dissatisfied with your purchase upon receipt of goods, we will refund your money.

**SEND FOR COMPLETE LIST**

**SINGLE TUBE TIRES**

First quality, fresh stock. Some Diamond, Goodrich, Goodyear and Pennsylvania makes. When ordering, state how many lugs wanted.

26 x 2½.............$8.00 28 x 2½.............$9.00 28 x 3.............$11.00

By securing a very large quantity of these goods, we are enabled to quote you these extraordinary low prices.

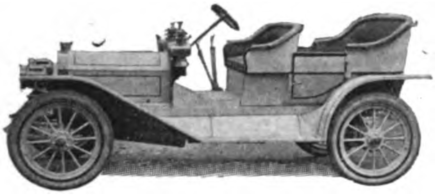
**EXCELSIOR TIRE CO., 1777 Broadway, New York**

KOKOMO TIRES
ARE ON THE SQUARE
KOKOMO RUBBER COMPANY
KOKOMO INDIANA.

**1909**

**Crawford.**

**Model H**



**Model H, Light Touring Car**
**25 H. P. Price, $1300**

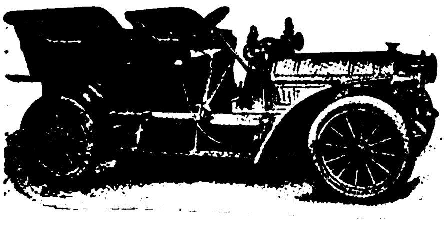
Model H is an entirely new design, planned to meet the requirements of those who want a high grade machine of standard design, sufficient horse-power, and light weight with accompanying low up-keep and yet at a moderate price. It has a 4-cylinder Rutenber motor—the cylinders being 4x4—which develops 25 H. P.; double ignition; cone clutch; selective type, sliding gear transmission; floating type rear axle, mounted on ball bearings. Double brakes on rear hubs. Wheel base, 104 inches. Tread 54 inches, weight 1,900 pounds. Furnished as a Runabout with Rumble seat for $1,250.

Other Crawford models are:

| | | | |
|---|---|---|---|
| Model "F" | 50 H. P. | 7 passengers | $3500 |
| " "D" | 35 H. P. | Runabout | 2500 |
| " "G" | 40 H. P. | | 3000 |

Write for our interesting dealers' proposition.

**Crawford Automobile Co.**
**Hagerstown, Md.**



**Model "G"—40 H. P.—$3000**

**AUTOMOBILE**
**Headquarters**

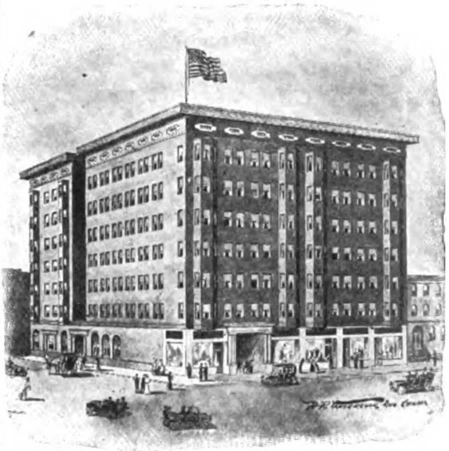
(NEW)

**SOUTHERN HOTEL**

**Michigan Boulevard and Thirteenth Street**

**CHICAGO**

COMPLETE IN APPOINTMENT
ARTISTIC
ABSOLUTELY FIREPROOF



300 Rooms. 200 with Private Bath.
200 with Circulating Ice Water.

EUROPEAN PLAN

Rooms with Hot and Cold Water,
$1.00 and $1.50 per day.
Rooms with Private Bath, $1.50 to $3.00 per day.

ALEX. DRYBURGH, Pres. and Mgr.
C. H. SHAW, Treas.

**New Annex Just Finished and Furnished**

HUBLER-DAYTON
STORAGE BATTERY

# It Pays to be SURE

The perfect running of your automobile or motor boat depends on a perfect ignition current. Most storage batteries are good when they are new, but to get a storage battery that is absolutely reliable, durable, and that will stay so as long as you need it, insist on the

## HUBLER-DAYTON STORAGE BATTERY

Not simply "Guaranteed against defects," but guaranteed to give service—you can get more miles of running out of the Hubler-Dayton Battery than any other made. The latest triumph of the largest concern in the United States making exclusively ignition apparatus.

## The Apple Battery Charger

Owners of automobiles, motor boats, and stationary engines have found the greatest economy and efficience from the use of this little ignition dynamo, using it as a direct sparker, or as a means of keeping batteries continuously charged and in efficient condition. Not only furnishes ample ignition current, but will maintain electric lights as well.

You should know more about our ignition specialties. Our business in this line has grown to be the largest in the world because we have enabled thousands to enjoy perfect ignition for their engines.

Our catalog is different—worth writing for to-day—right now.

**The Dayton Electrical Mfg. Co.**
**89 St. Clair St., Dayton, O.**

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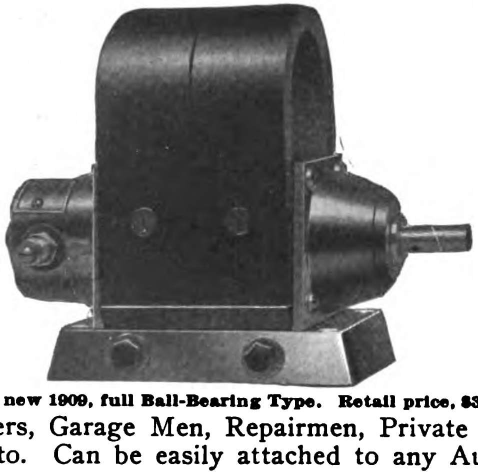
# THE M. & S. MAGNETO FOR ALL PURPOSES

**Make and Break or Jump Spark Ignition for Automobile, Commercial Vehicles, Motor Boat, and Gas Engines**



**Friction, Belt, Chain or Gear Driven**

**Plain or Ball Bearings**

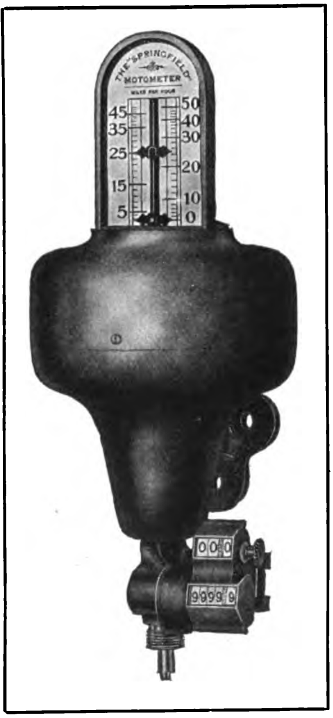
**Our new 1909, full Ball-Bearing Type. Retail price, $35.00**

Manufacturers, Garage Men, Repairmen, Private Owners, investigate our magneto. Can be easily attached to any Automobile, Motor Boat, etc. Starts and runs motors without batteries, and increases power 15 to 25 per cent. We supply special attachments for Maxwells, Fords and Buicks.

Will operate make and break ignition without coil.

Write to-day for special literature.

**MAVITY-SLEEPER COMPANY**
**123 Fifth Street - - FOWLER, INDIANA**



# ANNOUNCEMENT

## The Springfield Motometer

### SEASON OF 1909

In presenting the Motometer for its fifth season, we have fixed a price schedule, making it the greatest proposition of the year to both the trade and the car owner.

We shall sell the standard 50 mile model, new, perfect and up to the minute, at

**$25.00**

**60 mile model, $28.00** **100 mile model, $35.00**

**All models have Season and Trip Odometers.**

**Twenty-Five Dollars!** Do you realize the value contained in this price? You know what the Motometer is and what it has done in the past four years. If **reputation** won by actual service is anything, then the Motometer **is the** speedometer. We are not offering the unsold stock of an obsolete instrument, nor putting up a cheap one as bait for inquiries.

We are offering a standard accessory containing every valuable feature, backed by four seasons of splendid performance and covered by our full guarantee.

The car owner can instal it with **certain satisfaction.**

The dealer can handle it with profit and satisfaction. Ready for deliveries.

**The R. H. Smith Mfg. Co., Springfield, Mass.**

ESTABLISHED 1865. INC. 1883.

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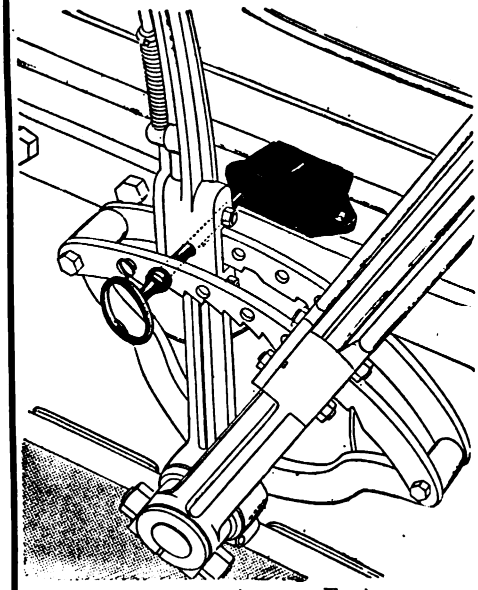


(PATENT APPLIED FOR)

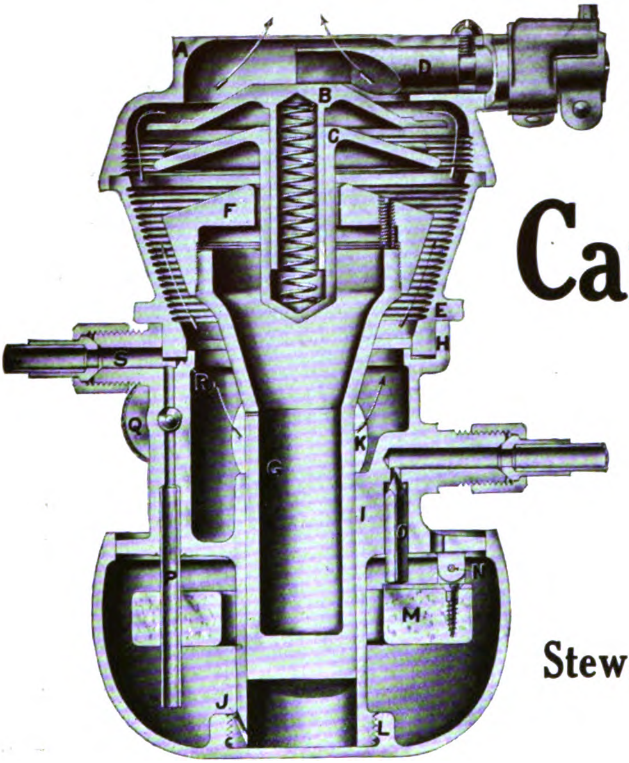
## The Latest Invention!!!

**Mr. Automobilist!!**

Are you sure that your Automobile is under good care? Have you stored your car in a Garage? Do you employ a Chauffeur? You have to send for our "Auto Lock" because—if our "Auto Lock" is attached on the sector of the side brake lever, your car cannot be driven away. You need not have any fear of leaving your car stand, our "Auto Lock" will make your car absolutely *Thief-Proof.* It is the best invention of its kind; there is nothing just as good in the market. Our "Auto Lock" will fit every car, American or Foreign. Price, $6.00, postpaid. Send for our printed matter today.

We want some live Agents in every State. Write for particulars.

**THE BONGARTZ CO., 423 Broome St., New York**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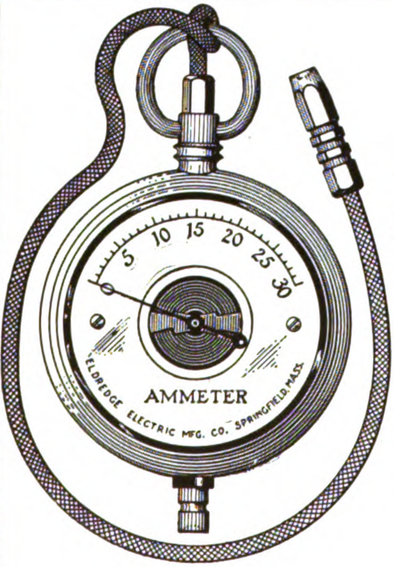
Stewart
PRECISION
Carburetor

New
Principle
No
Springs
Stays Right
30 Days' Trial

Stewart Machine Works
Los Angeles, Cal


5 10 15 20 25 30
AMMETER
ELDREDGE ELECTRIC MFG. CO. SPRINGFIELD, MASS.

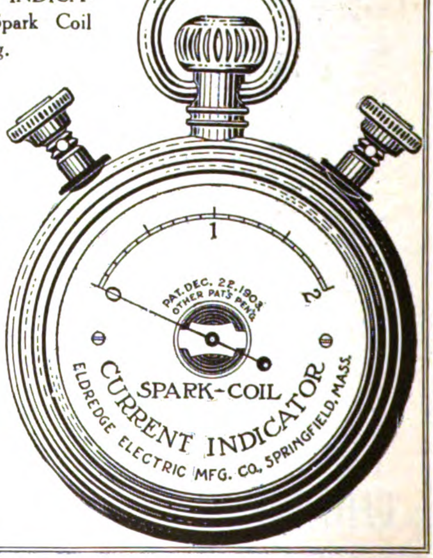
POCKET
Battery Ammeters

VOLTMETERS and VOLT-AMMETERS CURRENT INDICATORS, for Spark Coil Testing.

ACCURATE
DURABLE

Largest Makers in U. S. A.

Sold by Jobbers and Dealers


1
2
PAT. DEC. 22, 1903
OTHER PAT'S PEN'G.
SPARK-COIL
CURRENT INDICATOR
ELDREDGE ELECTRIC MFG. CO. SPRINGFIELD, MASS.

Eldredge Electric Mfg. Co.
Fort Street and Post Office Square
SPRINGFIELD, MASS., U. S. A.

# NEW SERIES TIMKEN SHORT BEARINGS

Cone

Roller

One Piece Cage Ring

Cone with Roller and Cage Assembled

Timken Short Bearing Complete

In offering the Automobile trade our **New Series Timken Short Bearings,** we do so with the assurance that they are made from the same carefully selected steel and subjected to the same severe tests as our standard size Bearings.

The **New Series Short Bearings** are designed for use in axles where the bearings space does not permit the use of our regular series.

These Short Bearings can be used in any axles, transmission or other places where Annular Bearings can be used. They carry **a much greater load** than Annular Bearings of the same length, **are smaller in diameter** and in addition will take as much **end thrust** as they do **radial load.**

Every bar of steel entering into Timken Products is made to the Timken analysis chemically—and tested to the Timken test physically—which means a rejection of **45 per cent.** of every ingot before metal of suitable density and soundness for Timken Roller Bearings can be obtained. These new Short Bearing Rollers are made from best nickel steel.

This is one reason why **65 per cent.** of the makers of high-grade Automobiles and over **90 per cent.** of the commercial truck builders of this country use Timken Roller Bearings. Write for catalog and prices.

We will exhibit: Grand Central Palace, Dec. 31--Jan. 7th; Madison Square Garden, Jan. 16--Jan. 23; Chicago, Feb. 6--Feb. 13.

**THE TIMKEN ROLLER BEARING AXLE CO., Main Office, Canton, Ohio**

**Branches: 10 E. 31st St., New York. 429 Wabash Ave., Chicago**

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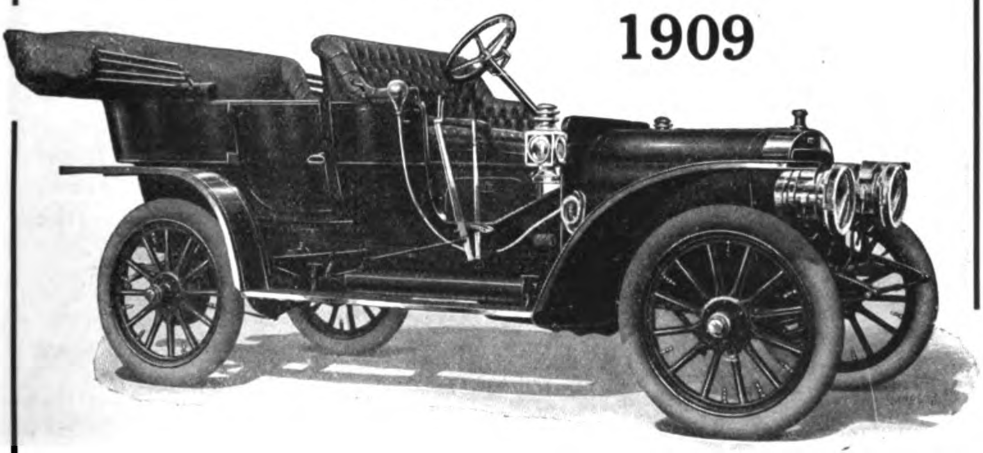
# Dorris

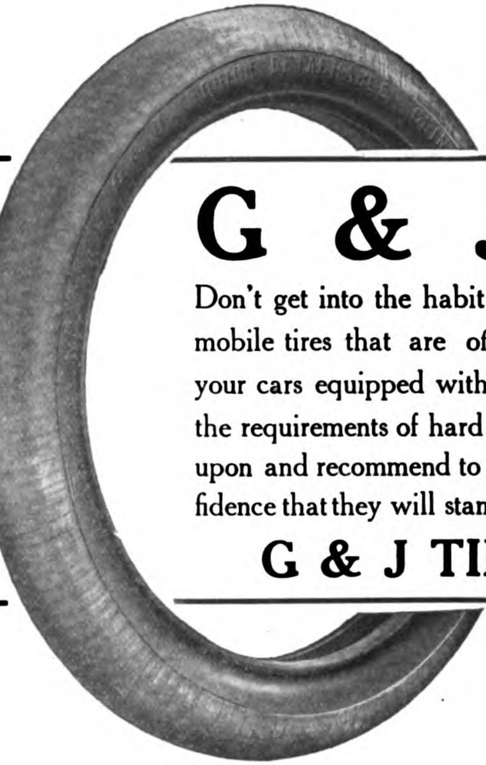
## 1909



**3-Point Suspension** **Valves in Head**

**Price, $2,500**

**DORRIS MOTOR CAR CO. :: :: ST. LOUIS, MO.**



G & J AUTO

Don't get into the habit of accepting any kind of automobile tires that are offered you. Insist upon having your cars equipped with tires that have proven to meet the requirements of hard usage—tires that you can depend upon and recommend to your customers with absolute confidence that they will stand up and give satisfactory service.

**G & J TIRE COMPANY**

DETROIT—256 Jefferson Ave.
CHICAGO—1434 Michigan Ave.
NEW YORK—10 W. Sixtieth St.
SAN FRANCISCO—414 Van Ness Ave.
DENVER—1541 Cleveland Place
BUFFALO—912 Main St.
PHILADELPHIA—713 N. Broad St.
LOS ANGELES—1010 S. Main St.
MINNEAPOLIS—21 S. Second St.

WHOLESALE—NO AGENTS—RETAIL

**LIVINGSTON RADIATOR COMPANY**

6 EAST 31st STREET, NEW YORK CITY

**EXPERTS IN RADIATION**

¶ Cool your Engine, Warm your Fuel and save in Life and Power.

¶ The Best Cars have Square Tube Radiators. The Best Square Tube Radiators are the LIVINGSTON, 50% Cheaper than the next best; 50% Dearer than the worst.

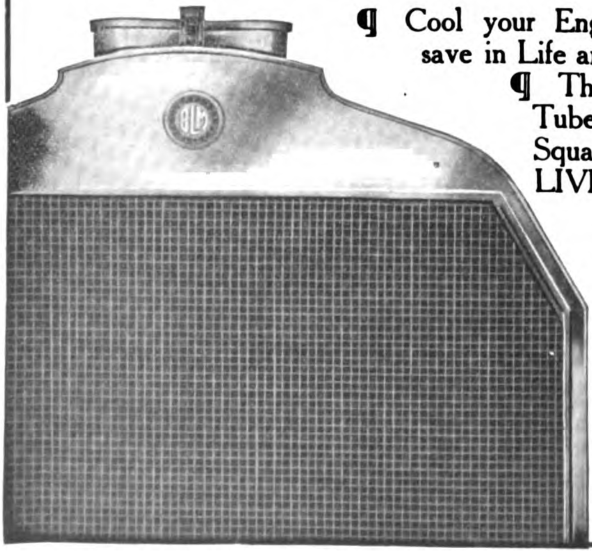
¶ Our Tubes in old Frames cure Overheating.

¶ 365 Days' Guarantee.

¶ No Order too Large.

¶ No Order too Small.

CORRESPONDENCE
SOLICITED



# MOBILE TIRES

You can make no mistake in specifying **G & J TIRES** because there are no better tires manufactured. We make this statement because we know how G & J tires are made—know the kind of materials they are made of—know the kind of service they give and how they compare with other tires.

*We shall exhibit at both the New York Auto Shows. Call and see us or write for our catalogue and prices*

**Indianapolis, Ind.**

OMAHA—1607 Harney St
ATLANTA—35 N. Pryor St.
ST. LOUIS—415 N. Fourth St.
BOSTON—110 Federal St.
PORTLAND—326 Burnside Ave.
KANSAS CITY—1607 Grand Ave.
CLEVELAND—326 Frankfort Ave.
PITTSBURG—Baum and Beatty Sts.

McIntyre

LINE OF HIGH WHEEL

# Motor Vehicles

## TEN NEW 1909 MODELS

Air cooled, four-cycle, planetary transmission, two speeds forward, one reverse. Solid rubber tires. Mechanical oiler. Wheel steer.

Two-cylinder, double opposed, offset type, chain drive, 12-14, 16-18 H. P.

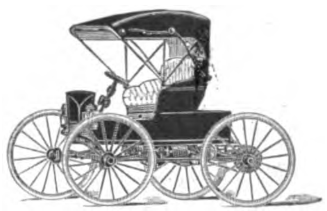
Four-cylinder, shaft drive, 28-32 H. P.

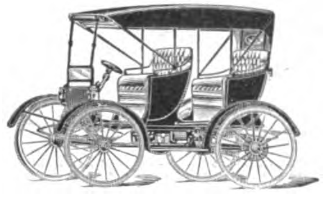
One, two, three seated Pleasure Vehicles and full line of Commercial Wagons.

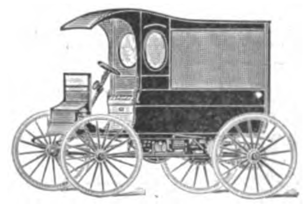
**Visit our exhibit, New York and Chicago Shows**
**Write for Catalog No. 46**

**W. H. McINTYRE CO.** (*Standard Manufacturers A. M. C. M. A.*)
**AUBURN, INDIANA**

256 Broadway, NEW YORK — 1730 Grand Ave., KANSAS CITY — Tudhope-McIntyre Co., ORILLIA, CANADA







The Star
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MANF'G BY
STAR SPEEDOMETER CO.
DANVILLE, PA., U.S.A.
0 5 10 15 20 25 30 35 40 45 50
MILES

# THE STAR

A speedometer with all the merits and none of the defects of its many competitors. As accurate as a watch, and as staunch as a steam engine. Nothing to get out of order, since there is only one spring in the entire instrument.

Investigate the "STAR" before purchasing a speedometer for your new car.

**Price, $25.00. Discount to the Trade**

## The Star Odometer

for Electrics and Runabouts has all the excellent features of the "Star Speedometer" with the exception of the speed gauge. The value of the "Star Odometer" can only be determined by test. It will save its cost many times over in a single season to the Electric Car Owner. Can be attached to floor or dash.

**Price, $15.00**

Manufactured by THE STAR SPEEDOMETER CO., Danville, Pa.

## GEO. W. NOCK CO., Philadelphia, Pa.

Distributers for Pennsylvania, New Jersey, Delaware, Maryland and Virginia

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**Two of our 25 different Styles**

# AJAX TRUNKS

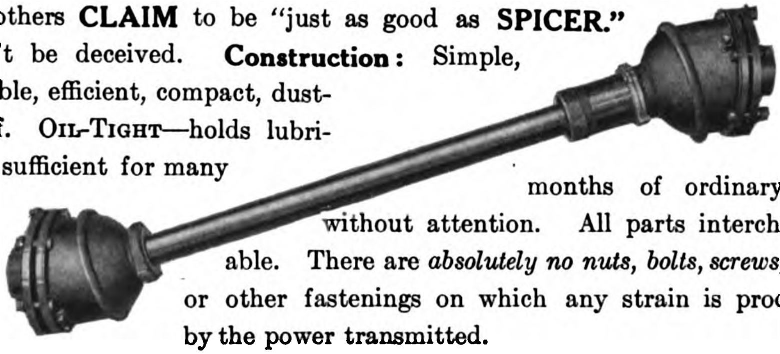
**Largest Manufacturers of Auto Trunks, Luggage Carriers, Covers, Fabric Goods of every description**

## Write for our "1909" Catalogue and Price List

## Ajax Trunk and Sample Case Company

91-93 Mercer Street : : : : : NEW YORK

# Spicer Universal Joints are STANDARD



All others **CLAIM** to be "just as good as **SPICER.**" Don't be deceived. **Construction:** Simple, durable, efficient, compact, dust-proof. Oil-Tight—holds lubricant sufficient for many months of ordinary use without attention. All parts interchangeable. There are *absolutely no nuts, bolts, screws, pins* or other fastenings on which any strain is produced by the power transmitted.

**"Spicer Quality—The Best Possible"**

**SPICER UNIVERSAL JOINT MFG. CO.**
**15 MADISON AVENUE : : : PLAINFIELD, N. J.**
**Factory Sales Representative, K. Franklin Peterson, 166 Lake Street, Chicago, Illinois**

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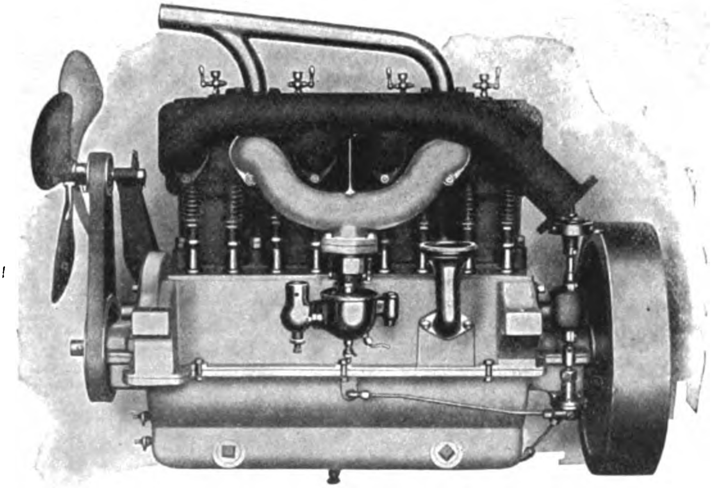
# NORTHWAY MOTORS

**POWERFUL**



**SILENT**

They include integral oiling system, fan, timer, carburetor and provision for magneto. Made in three sizes, 20-25-32 H. P.

Write for printed matter.

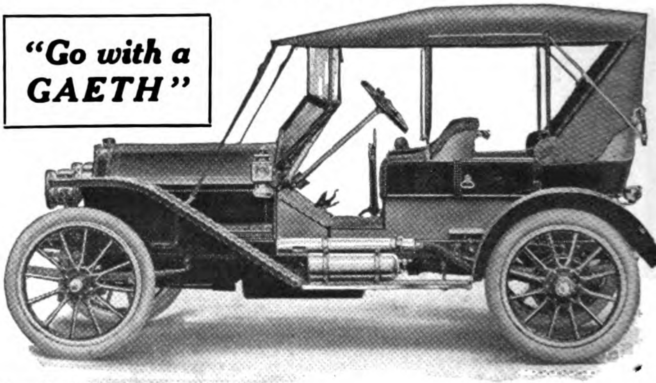
**Northway Motor & Mfg. Co., Detroit, Mich.**

# We Want Agents For the Best $3,500 Car on the Market!

# THE GAETH

**Four classy cars in the line and every one a great sales opportunity. Five or seven passenger touring car; short-coupled body; Tourabout and Limousine. All $3,500 except the Limousine, which is $4,500. They represent the BEST in automobile construction to-day and have many exclusive features. See our WRITE-UP in this issue for full particulars. ¶ It will PAY interested dealers to investigate our proposition. WRITE US, addressing Dept C, and we will send full particulars and a copy of our Advance Showing for 1909. Our representative is now in the East with a Tourabout and we can arrange for a demonstration, if desired.**

***"Go with a GAETH"***



**The Gaeth Automobile Co.**
**Cleveland - - Ohio**
**Member A. M. C. M. A.**

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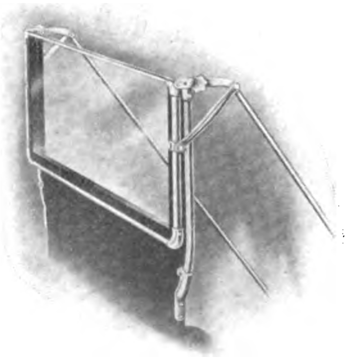

**Wheeler**

**WIND SHIELDS**

A shield of new and exclusive features. ¶ Elegance in design and finish. ¶ Accessibility and ease in operation. ¶ Durability and simplicity in construction. ¶ Safe and silent in service. ¶ Folds down inside of dash.

## Detroit Auto-Shield Co.

1200 to 1300 Woodward Avenue, Detroit, Michigan

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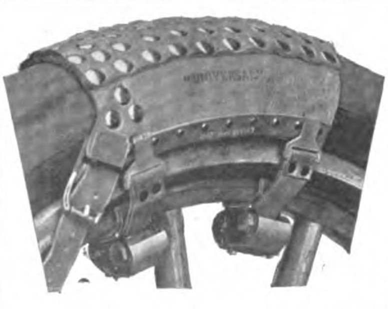


## "Universal" Detachable Full Tread

The IDEAL WINTER NON-SKID PROTECTOR.

The safe and sane tire protector for all road conditions. THE ONLY TREAD ON THE MARKET HAVING AN ADJUSTABLE TENSION ANCHORAGE. Unlimited TENSION; Always ADJUSTABLE. An efficient ANCHORAGE eliminates TIRE INJURY. An ARMORED OVERCOAT for your TIRE; ABSOLUTELY NON-SKID and PUNCTURE PROOF. Get them from your Dealer, or direct from factory. Write for descriptive Circular and 1909 proposition.

## "Universal" Emergency Sleeve

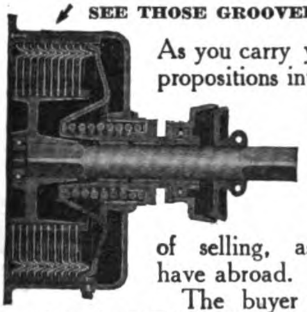
Every JOBBER and DEALER should have our proposition on the "UNIVERSAL" EMERGENCY SLEEVE, for 1909. PLACED IN ONE MINUTE WITH OUR UNIVERSAL ADJUSTABLE RATCHET ANCHORAGE; NO LACING; NO BUCKLES; HOLDS ANY BLOW-OUT. Write for Descriptive Circular and Prices.

**UNIVERSAL TIRE PROTECTOR CO. - - - ANGOLA, IND.**

# Hele-Shaw Clutch

## The Maintenance Guarantee of Commercial Vehicles

**SEE THOSE GROOVED DISKS**



As you carry your truck propositions into a wider field, you MUST come to this method of selling, as dealers have abroad.

The buyer will demand it, the HELE-SHAW CLUTCH will enable you to give it. Write for catalog.

**MERCHANT & EVANS COMPANY**
**(Mech. Dept.)**
**Philadelphia**
New York Chicago Baltimore Kansas City Denver
*LOOK US UP AT THE SHOW*

---

# Maxwell Test Proves J-M Non-Burn Brake Band Lining the Best

An impartial test made of the various brake linings by Mr. J. D. Maxwell with a Maxwell car containing five persons and weighing 2,850 pounds, results of which appeared in November issue of The Motor Age, should be of interest to all automobile manufacturers and owners. It proved that J-M NON-BURN will stop a car much quicker, with less noise, slippage and jerking than any other lining.

The test was made by speeding car to 30 miles an hour on a macadam road and then applying the brakes full strength. Following are results:

**J-M (Asbestos) NON-BURN LINING:**
Wheels locked immediately
**Cast Iron Blocks:**
Car traveled 25 feet before wheels locked
**Hickory Blocks:**
Car traveled 17 feet before wheels locked
**Red Fibre Lining:**
Car traveled 12 feet before wheels locked
**Camel's Hair Lining:**
Car traveled 12 feet before wheels locked

In addition to J-M NON-BURN LINING locking wheels instantly, it did so without the disagreeable noise and jerking noticeable with the others.

**WRITE NEAREST BRANCH FOR SAMPLE AND BOOKLET**

**H. W. JOHNS-MANVILLE CO.**

| | | | |
|---|---|---|---|
| New York | St. Louis | Baltimore | Los Angeles |
| Milwaukee | Pittsburg | New Orleans | Seattle |
| Chicago | Cleveland | Kansas City | Dallas |
| Boston | Buffalo | Minneapolis | London |
| Philadelphia | Detroit | San Francisco | |

930

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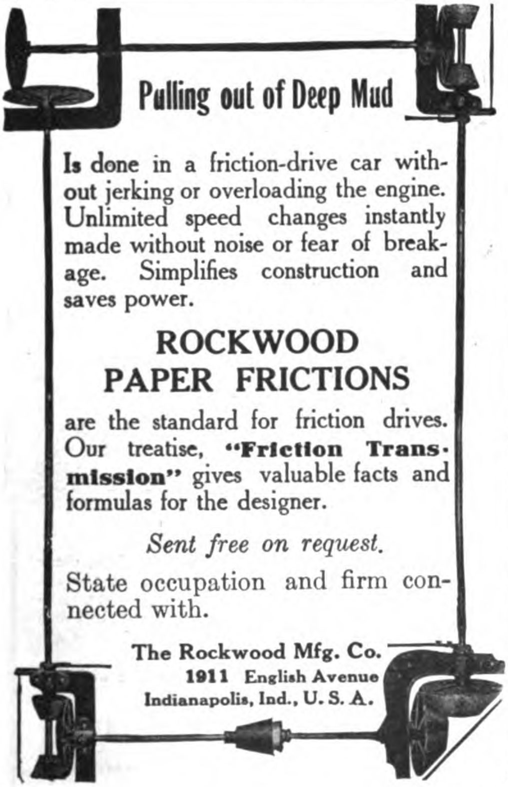

## Pulling out of Deep Mud

Is done in a friction-drive car without jerking or overloading the engine. Unlimited speed changes instantly made without noise or fear of breakage. Simplifies construction and saves power.

**ROCKWOOD PAPER FRICTIONS**

are the standard for friction drives. Our treatise, **"Friction Transmission"** gives valuable facts and formulas for the designer.

*Sent free on request.*

State occupation and firm connected with.

**The Rockwood Mfg. Co.**
**1911 English Avenue**
**Indianapolis, Ind., U. S. A.**

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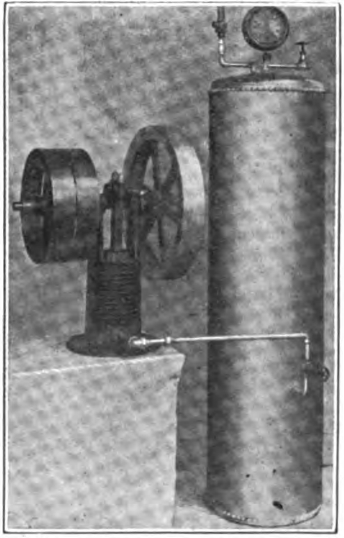


## STOP AND THINK

What a benefit compressed air is to your tires and your pocket book. The life of your tires is considerably increased by always having the proper pressure.

Every up-to-date garage should have compressed air on tap.

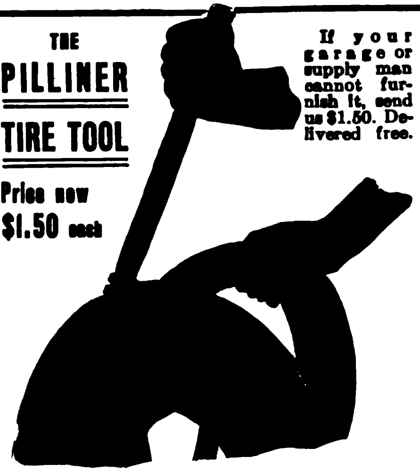
Send for booklet and prices on complete apparatus, both motor and belt driven.

**L. C. WARD MACHINE CO.**
**201 N. J. R. R. Ave. Newark, N. J.**

## THE PILLINER TIRE TOOL

**Price now $1.50 each**

If your garage or supply man cannot furnish it, send us $1.50. Delivered free.



- Dealers and Garages, you are missing a good thing by not having the Pilliner tool for sale. The consumer who has once used it is our best advertiser. Send for a sample, at wholesale price, so we can demonstrate it to your satisfaction. It's the "greatest ever" for setting valves or lugs. Does not injure the casing, and is right in every respect.

MANUFACTURED ONLY BY

**N. A. PETRY**

423 Commerce St. : : Philadelphia

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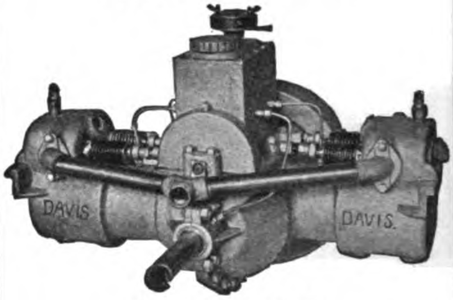
# FOR SALE

## Motors

**5 in. x 4 in.-Two Cylinder Opposed. 18 H. P.**



**WE ALSO MAKE**

4½ in. x 4 in. 2 Cylinder Opposed
5½ in. x 4½ in. 2 " "
6 in. x 4½ in. 2 " "

**Our new shop will take care of your Orders.**

**DAVIS MFG. CO.**

MILWAUKEE, :: WIS.

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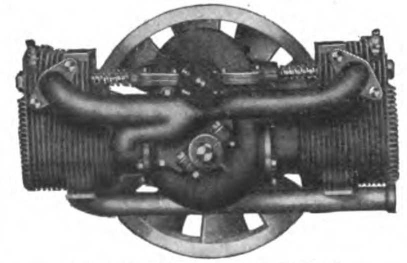
# TESTS TELL TRUTHS

**The test of time has proven that**

# The Beilfuss Two-Cylinder Motors

are the simplest, most powerful and most economical of their class.



**AIR AND WATER COOLED**

**Water-Cooled, 10 to 12 H. P. and 18 to 20 H. P.**

**Air-cooled in one size, 10 to 12 H. P.**

BEILFUSS engines are in general use all over the United States, and there are hundreds of satisfied users to whom we can refer you. So you run no risk with the BEILFUSS.

May we give you further particulars and prices?

**THE BEILFUSS MOTOR CO.**

**LANSING, MICH.**

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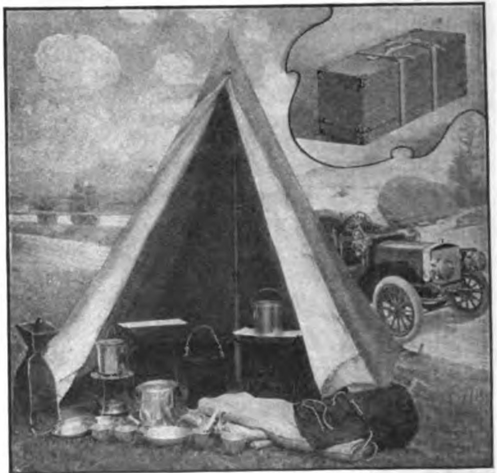

## AUTO-CAMP

The Auto-Camp is the most up-to-date, complete and compact outfit on the market to-day. Indispensable to Automobilists or Canoeists. Entire outfit, as illustrated, folds and packs in Fibre Case, size (30 x 10 x 12) shown above. Case straps on running board.

We would be pleased to furnish you with full particulars and price upon request.

**CHARLES J. GODFREY COMPANY**

10 Warren Street, NEW YORK

# "Exide"

**Vehicle Batteries** or **Sparking Batteries** made up of plates having this name moulded on the lug give the **Best Possible Service.**

## THE ELECTRIC STORAGE BATTERY CO.

**PHILADELPHIA**

**NEW YORK BOSTON CHICAGO ST. LOUIS CLEVELAND ATLANTA**
**SAN FRANCISCO TORONTO**

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# The Elwell-Parker Electric Co. of America

**Manufacturers of following Parts for Electric Vehicles, for both pleasure and commercial purposes:**

- **Motors**
- **Controllers**
- **Front and Rear Axles**
- **Power Plants**
- **Complete Chassis, ready for body, tires and batteries**

**Office, No. 4223 St. Clair Ave.**
**Works, 4300 Hamilton Ave.**
**CLEVELAND, OHIO**

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# TRAVER BLOWOUT PATCH

TRAVER PATENT
SHOE
BLOW OUT PATCH
SEPT

*GOES INSIDE OF SHOE*

**Made of FABRIC and Rubber, like an AUTO SHOE; with a brass flange that prevents it from "CREEPING."**

**YOU NEED NOT CARRY EXTRA SHOES if you carry Traver Patches.**

**THE ONLY road repair for a RIM CUT; THE BEST in the World for a BLOWOUT**

**DON'T THROW WORN SHOES AWAY Traver Patches Make Them Serviceable**

**A MONEY-SAVER for the OWNER; A TROUBLE-SAVER for the CHAUFFEUR**

FOUR SIZES

| | |
|---|---|
| No. 0—For shoes 2½ and 3 in. | $2.50 |
| No. 1—For shoes 3½ in. | 3.00 |
| No. 2—For shoes 4 and 4½ in. | 3.50 |
| No. 3—For shoes 5 and 5½ in. | 4.00 |

**Three Styles: CLINCHER—DUNLOP—FISK State Size and Style required.**

**For Sale by All Dealers, or Sent Anywhere in the United States upon receipt of price.**

## Traver Blowout Patch Co.

**Patentees and Manufacturers**

**1779 Broadway NEW YORK**

See our exhibit at Grand Central Palace Show, opening in New York on New Year's Eve, and at Madison Square Garden Show, opening in New York on Jan. 16

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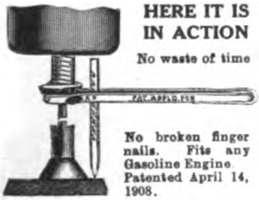
# Triumph Valve Remover



HERE IT IS IN ACTION

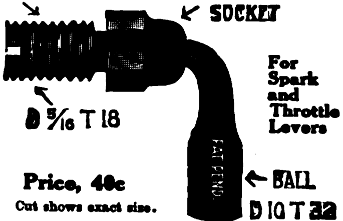
No waste of time

No broken finger nails. Fits any Gasoline Engine. Patented April 14, 1908.

**Enables you to remove valve key or valve spring with no side strain or bending of valve stem. Price, $1.00 each. Discounts to manufacturers and jobbers. For sale by supply dealers throughout the United States. If your dealer cannot supply you, send us P. O. order for $1.00 and the Remover will be sent you postpaid.**

# Adjustable Ball Joints

**for throttle and spark levers, connecting carburetor and timer with levers on wheel steer, eliminating all lost motion and giving a more perfect control to these levers at all times. Easily and perfectly adjustable.**



**For Spark and Throttle Levers**

**Price, 40c**

**Cut shows exact size.**

**Adjustable stock size, steel, 40c each. Adjustable stock size, brass, 50c each. Non-adjustable stock size, steel, 20c each.**

**Manufactured by**

**MECHANICAL & ELECTRICAL MFG. CO., 52 N. Desplaines St., Chicago**

**Price One-Finger Mittens**

are the ideal cold-weather hand-covering for the autoist. Lined with Wool-Fleece, Imported Lambskin or Imported Blue Rabbit Lining. **$2.50 to $7.00 per pair.**

Mr. Dealer, write us for catalogue showing our complete line and telling about its double profits for you.

**Henry W. Price Company**
*Dept. F.*
ROCKFORD, ILLINOIS

HARLAND'S ENGLISH VARNISHES
DIEU ET MON DROIT
ESTABLISHED 1791

**Harland's English Varnishes**

*Specially manufactured to meet the requirements of the automobile trade*

**Auto Body Finishing**
**Auto Gear**
**Auto Rubbing**

These varnishes have all the well known characteristics of our world renowned Coach Builders' Varnishes, with special drying qualities which render them unique in their value to automobile manufacturers. Their quality of standing up under the severe conditions to which they are subjected is unsurpassed.

**WM. HARLAND & SON**
FACTORY
MERTON, LONDON, S W., ENGLAND
BRANCHES
New York, Chicago, Toronto, Paris, Milan, Sydney, Melbourne, Cape Town, etc., etc.
U. S. A. Headquarters: 168 Centre St., New York

**Automobile Bodies**
**Furnished Completely**
**Trimmed and Finished**
**The B. F. Everitt Co., Detroit, Mich.**

**Round-tire Trunk**
Arranged for Hats, or Plain for Inner Tubes.

**AUTO TRUNKS**

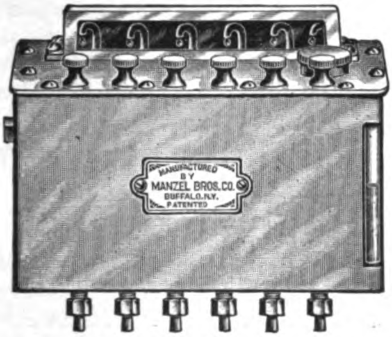
**Single, Double, Triple and with Inside Grips**

Write for Special Catalog

Manufactured by

**W. W. Winship**
69 Summer St., Boston, Mass.

## MANZEL
### FORCE FEED OILERS

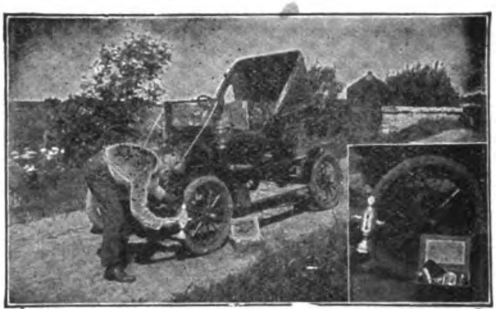


For lubricating the cylinders and bearings of all kinds of Gas and Gasoline Engines.

Feed always in sight.
Each feed regulated independently.
Easily regulated.
Positive.
Any number of feeds.
Rotary or Ratchet Drive.

**WRITE FOR FULL PARTICULARS**

**MANZEL BROTHERS CO.**
**320 Babcock St., Buffalo, N. Y., U. S. A.**



## Large Enough to do Good Work
## Small Enough to Carry on the Road

Would you run a deflated tire day in and day out without trying to inflate it? Of course you would not. There is, however, the same kind of economy. In running the tire with small holes and cuts in it when it only costs a fraction of a silver dime and a few minutes of your time to permanently Vulcanize them with a Little Wonder Vulcanizer. Anyone can operate this Vulcanizer anywhere, out upon the road if necessary. They are guaranteed to do the work. Made of iron, the price is $6.00, of aluminum $7.00. This is a complete alcohol heat Vulcanizing outfit. In ordering mention size of tire. Write today for illustrated catalog. Please mention Trade Journal.

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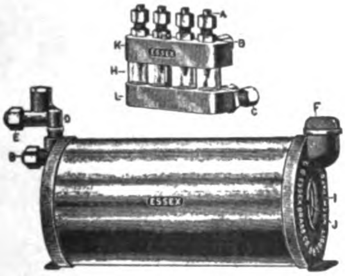

# Automatic

Lubrication is the only successful method of lubricating **Automobiles**. **Always ready** and never gets out of **order.** 50,000 in use.

**G. B. ESSEX BRASS CO.**
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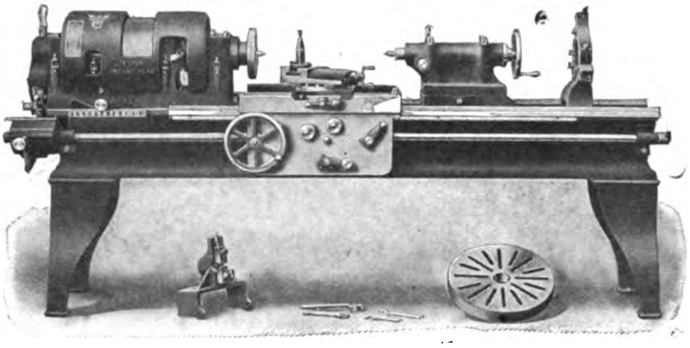
THE INCREASE IN THE NUMBER OF Automobile Manufacturers that are using the

# Hancock Oiler

on their 1909 Models is very noticeable. It can only mean that they consider the HANCOCK far superior to others.---And it is.

**Hancock Mfg. Co., 776 E. Henry St., Charlotte, Mich.**



We build lathes from 14", 16", 18", 20" up to 48" swing. We will furnish gladly production estimate on automobile pieces when machined on our lathes.

**THE LODGE & SHIPLEY MACHINE TOOL CO.**
**Cincinnati, Ohio**

No. 06
REGISTERED BARRETT TRADE MARK
THE DUFF MFG. CO. ALLEGHENY, PA.

**Improved BARRETT Automobile JACK**

**Its new reversing lever, which can be set with a tap of the jack handle or finger, eliminates the last inconvenient feature of using an automobile Jack.**

**Catalog free.**

**The Duff Manufacturing Company**
**Exclusive Makers of "Barrett" Jacks**
**PITTSBURGH, PA.**

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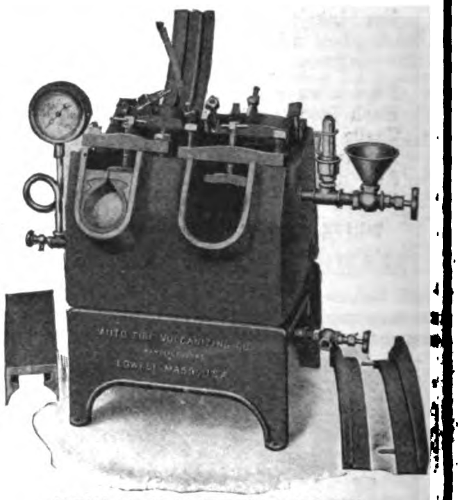
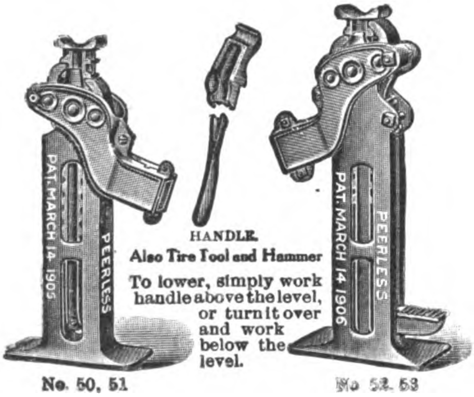
**ADJUSTABLE SECTIONAL VULCANIZER**



NEW IMPROVED 1909 MODEL

Made in three sizes.—No. 4 has 2½" and 3" pockets; No. 5 has 3½" and 4" pockets; and No 6 has 4½" and 5" pockets. Each machine is fitted with six sets of bead irons, four clamps (two for each pocket), base, steam gauge, pop safety valve and globe valve and filler. They are furnished to connect either steam boiler, gas or gasoline burner. The new vulcanizers are cast in one piece and steam jacket. You will surely need one in your repair shop. Prices range from $90. to $125. Send for printed matter.

AUTO TIRE VULCANIZING CO.
Lowell, Mass., U. S. A.



HANDLE.
Also Tire Tool and Hammer

To lower, simply work handle above the level, or turn it over and work below the level.

No. 50, 51 No. 52, 53

**The Improvod Peerless Jack for 1909**

UNITED STATES AND FOREIGN PATENTS GRANTED

**Made of Malleable Iron**

Is strong, compact, light, rapid, cheap and by far the most popular Automobile Jack on the market. Can be placed and operated without getting under the car. It is automatic, works at any angle and can be used for pushing as well as lifting. The leverage is much easier than on our former make. The handle, being made of iron, will not break nor work loose in the handle socket. It is shaped to make an excellent tire tool and can also be used as a hammer. Working the handle below the level raises. To lower simply turn it over or work above the level. Nothing easier; nothing simpler.

**See our exhibit at both New York Shows also Chicago Show**

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**F. W. OFELDT & SONS, Nyack-on-the Hudson, N. Y.**

**STEAM GENERATING OUTFITS**

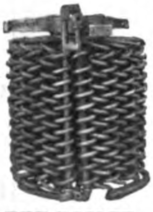
**Consist of Safety Water Tube Boiler, Automatic Water Regulator, Blue Flame Kerosene Burner, Automatic Fuel Regulator, Burner Valves and Strainers**

We also manufacture DOUBLE ACTING COMPOUND STEAM ENGINES, of from 15 to 30 Horse Power. FEED WATER HEATERS, AUTOMATIC AIR PUMPS.

**OUR NEW AUTOMATIC FUEL FEED**

absolutely does away with all air pressure on the fuel. In less than a minute, when starting, 50 or 150 pounds pressure can be secured Price for size 18 x 4 in., $30.00.

All our Specialties are adapted to Whites, Stanleys, Lanes and other makes of steam cars.



THE BOILER

| Size O. D. | Height | H. P. | Price |
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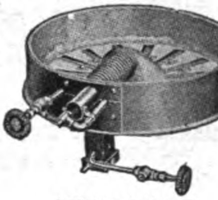
| 15½ or 16 ins. | 22 in. | 4-6 | $112.50 |
| 17½ or 18 " | 23½" | 6-8 | 135.00 |
| 20 " | 25 " | 8-10 | 180 00 |
| 22 " | 26 " | 10-12 | 225.00 |
| 24 " | 26 " | 12-15 | 270 00 |
| 28 " | 30½" | 20 | 385 00 |
| 32 " | 36 " | 30 | 480.00 |
| 36 " | 48 " | 40 | 560 00 |



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FOR **AUTOMOBILE** AND
MACHINERY MANUFACTURERS

TRADE DA MARK

*WE ALSO MANUFACTURE STEAM HAMMER FORGED*
**HIGH GRADE CRANK SHAFTS**
EITHER ROUGH FORGINGS,
OR COMPLETELY MACHINED.

**ANDERSON FORGE & MACHINE Co.**
*21-31 ST. AUBIN AVE.*
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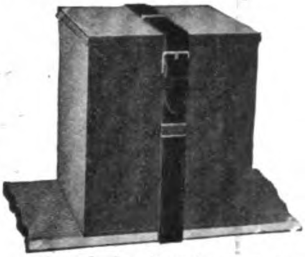
HERE'S SOMETHING ALL MOTORISTS WILL APPRECIATE

# THE NEW DOVER TOURIST OIL AND GASOLINE KIT

Opened



Attached to Running Board

**A neat, compact and dust-proof device for carrying extra oil and gasoline when touring.**

## The Tourist Oil and Gasoline Kit

consists of a fine, black enamel steel case containing two special enameled cans, having a capacity of over 1½ gallons EACH, with special pouring spout and filler cap.

**INSTANTLY ATTACHED AND DETACHED**

**Price, complete with strap, $3.50**

Correspondence Solicited.

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TRADE
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MARK
GIVES COMFORT

# Renders Tires Puncture Proof

and prolongs their life 100%. Porous tires made absolutely tight instantly and give no further trouble until cover is worn through. Price reasonable — material easily applied. Local exclusive agents wanted. Conclusive evidence of merit proven by testimonials from best people in the country. Write or send 53 cents for sample carton which is sufficient for a Bicycle Tire to the

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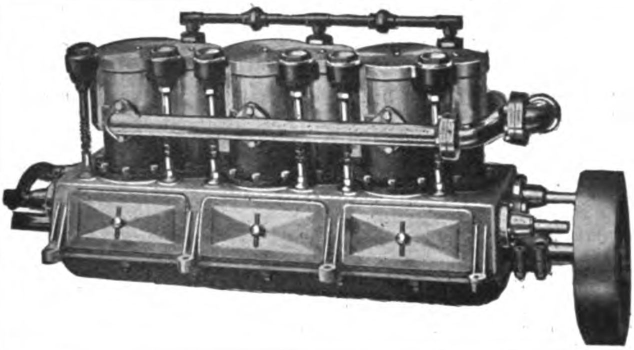
**229 Washington St., Newark, N. J.**

Demonstrated before Board of Governors, Harrisburg Motor Club, with great success

We will exhibit at Madison Square Garden Show



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for Automobiles, Trucks and Boats.

**WRITE FOR PARTICULARS**

Manufactured by

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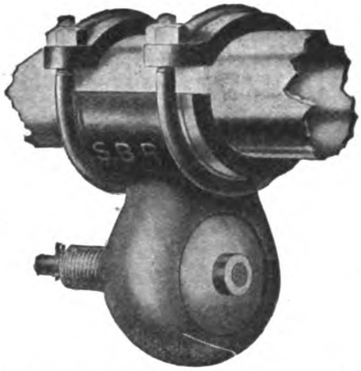
## Keep Tabs ON THE Working Of Your Motor



Fit an S. B. R. Cut-Out to your exhaust pipe, which will not only relieve back pressure, but increase the hill climbing ability of your car, and enable you to keep track of how the cylinders are working by listening to the explosions. Easily attached. Sold through dealers. Prices, $3.75 to $6.75. Ask for descriptive matter.

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Just as the heart is the real motive influence in the human system, so is the

# PUMP

the really vital part of your engine. If you get a pump, regular, uniform and up to rating, your troubles will be minimized.

## Oberdorfer Geared Pumps

Do the work they are built to do. Get a catalog.

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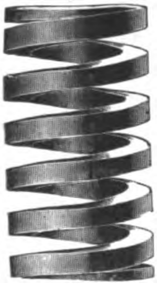
of every description for engines, motors, etc.

Send samples or specifications and let us figure on your requirements.



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All goods made to order and prompt service guaranteed.

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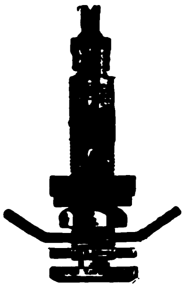


(Half Size)

ESTABLISHED 1844

**Schrader Universal Valves**

Trade Mark Registered April 30, 1895

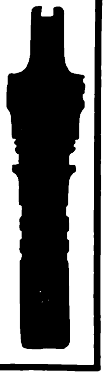
**SIMPLE AND ABSOLUTELY AIR TIGHT**

Schrader Motor Tire Valves, as shown in cut, are the regular equipment for G & J style Motor Tires, whether used on ordinary rims or demountable rims, such as Michelin or Continental Ready-Flated Tires, and are also used on Hartford Detachable, Fisk Detachable and New Goodyear Detachable Motor Tires.

Our No. 777 Motor Tire Valve is the standard for 2½" and 3" tires, and our No. 725 Motor Tire Valve is the standard for tires larger than 3".

Schrader Universal Valves as shown in cut and in different modifications, are used on all Bicycle tires made in this country. These Valves are supplied to the trade by all Tire Manufacturers. Valve Parts can be obtained from the Tire Makers or from the Manufacturer.

**A. SCHRADER'S SON, Inc., 28-30-32 Rose St., New York City, N. Y.**



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**Automobile Parts**

We are the only American manufacturers of the genuine Square, Seamless Tube, Honey Comb

**Radiators**

We also manufacture Hoods, Tanks, Mud Guards, Mud Aprons, Metal Dashes, Mufflers, Metal Hampers, Sprocket Covers, etc., and do Aluminum Brazing, Pipe and Tube Bending and Brazing, as well as repairing of all kinds in our line.

EXHIBIT 230, MADISON SQUARE
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**The A-Z Company**

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THE WISE MEN OF THE EAST
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USE THE

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SPARK PLUGS

"THEY SPARK IN WATER"

YOU TRAVEL FAR
YOU TRAVEL GOOD

JEFFERY-DEWITT CO.
216 - HIGH ST. NEWARK, N.J.

SEE OUR EXHIBIT
AT BOTH NEW YORK SHOWS

**"BOYS, WE HAVE THEM BEAT TO A FRAZZLE"**

Order one while your car is in winter storage. Perfectly rigid. No strong arms needed for the roughest roads. A lady may drive the swiftest car without fear. Write for prices.

**THE ADDISON, 113-115 So. Hoyne Ave., CHICAGO, ILL.**

**Aluminum, Bronze, Manganese Bronze**

**CASTINGS**

**"SUPERIOR" BABBITT**
**"PLATA" WHITE BRASS**

**25 YEARS' EXPERIENCE**

**ROCHESTER**
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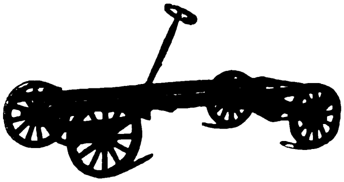
**NOW LOOK HERE!**

We make pressed steel or angle iron frame gears, with chain or shaft drive, any height of wheels, and any wheel base up to 138 inches.



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Get our catalog of Chassis, bodies, wheels, axles, steering devices and cars ready for power.

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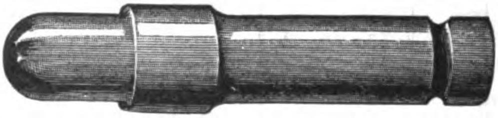
**IMPERIAL PORCELAIN SPARKING TUBES**



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**The Imperial Porcelain Works, Trenton, N. J.**

When desiring quotations always send sample or drawing of style required.

VELOX INNER TUBES
HIGHEST QUALITY

Jobbers and Distributers of
AUTOMOBILE SUPPLIES

MANUFACTURERS' SUPPLIES CO.
418 ARCH STREET, PHILADELPHIA, PA.

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AUTOMOBILES
SELF PROPELLED VEHICLES
J. E. HOMANS
A PRACTICAL TREATISE WITH ILLUSTRATIONS AND DIAGRAMS
$2
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**Are you interested in Automobiles?**

If you are, an early purchase of "HOMAN'S SELF-PROPELLED VEHICLES" will prove a good investment.

This work is now the accepted standard on the practical care and management of motor cars—explaining the principles of construction and operation in a clear and helpful way, and fully illustrated with many diagrams and drawings.

The presentation of subjects has been determined by consideration of the needs of the man behind the wheel. It is clear and concise in its treatment and comprehensible to the most inexperienced automobilist, at the same time it is so thorough that the expert will learn much from its pages.

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Contains 608 pages, over 400 diagrams and illustrations, printed on fine paper, size 5¾x8½ inches, with generously good binding. Highly endorsed.

**No money in advance required, sign and return**

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**Kindly mail me copy of "Homans' Auto." and if found satisfactory I will immediately remit $2 or return book to you.**

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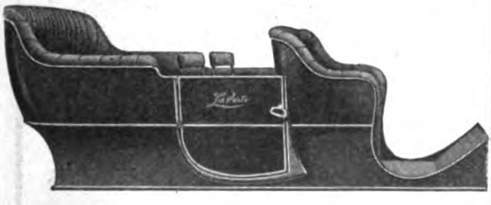

First class bodies, either wood or metal, painted or upholstered complete from original designs by experienced draughtsmen or following blue prints submitted.

We also make a specialty of

**AUTOMOBILE TOPS**

**Correspondence Invited.**

**LaPorte Carriage Co.**

**LaPorte, Indiana**

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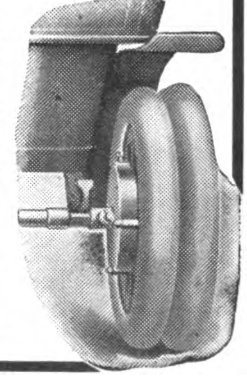
# BURROWES SPARE WHEEL

Best emergency wheel made. Carried equipped with inflated tire on step or back of car, ready for instant use. Applied without removing deflated tire. Clamps securely to rim of auto wheel. Creeping impossible. Makes no difference in running or steering of car. All standard sizes for clincher or quick detachable tires.



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**Portland, Maine**

The RELIANCE Igniter Storage Battery (Celluloid Jar)
RELIABLE Igniter Storage Battery (Hard Rubber Jar)

Also Motor Cycle Type in Celluloid or Rubber
We make 44 standard styles and sizes

Our 18th year in the manufacture of Storage Batteries and accessories of every kind.

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SEAMLESS-STEEL-TUBING
ONLY TUBE MADE SUITABLE
FOR BICYCLE CONSTRUCTION
SEND FOR OUR ILLUSTRATED
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LUBRICATING OIL at 5 Cents Per Gallon

Is better for motor bearings when fed direct by Mechanical Oiler—than $1.00 OIL after use in crank case of "Internal" Lubricated Motors. The Oiler to put it there All The Time and All The Way is

THE HILL PRECISION OILER

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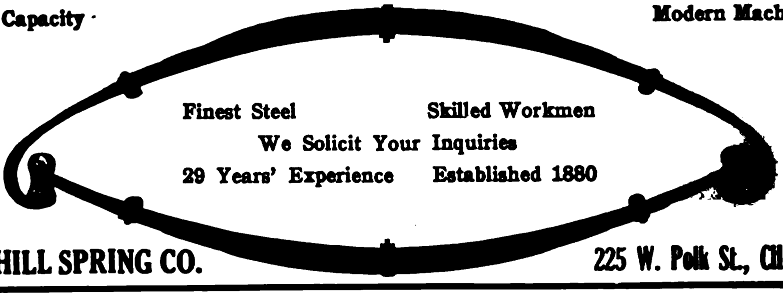

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Large Capacity Modern Machinery

Finest Steel Skilled Workmen
We Solicit Your Inquiries
29 Years' Experience Established 1880

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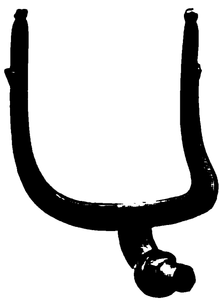
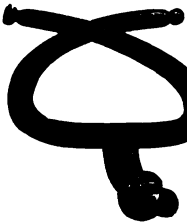


# LAMP BRACKETS of CAST STEEL



Bent Cold

**CHEAPEST AND BEST**

Furnished plain as per cut, or **with stub threaded and fitted with nut and washer ready for attaching.** Can also furnish special stub **attachment to fit any** car, or cast with special solid **stub.**

**JAPANNED, BRASS OR NICKEL PLATED**

**WE ALSO MANUFACTURE AUTOMOBILE CASTINGS OF CRUCIBLE STEEL**

***Please write us before making your contract***

**CHICAGO STEEL FOUNDRY COMPANY, Chicago, Ill., U. S. A.**

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# BURNET COMPOUND INNER LEAF SPRINGS

**The only automobile Springs on the market that do the work.**

**Insist upon your dealer placing a set of these Springs on the new car that you are buying.**

**Find out what automobile riding really is by placing them on your old car.**

**Be sure and see our exhibit in the Automobile Show at Grand Central Palace—Section 3, No. 3, 2nd balcony; also at Madison Square Garden—balcony No. 241.**

**BURNET COMPOUND SPRING, Inc.**

**738 Broad Street, Newark, N. J.**

**Salesrooms, 1611 Broadway, N. Y. Address communications to Dept. B.**

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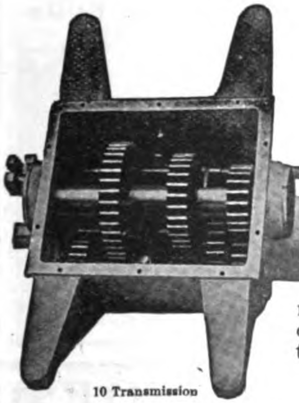
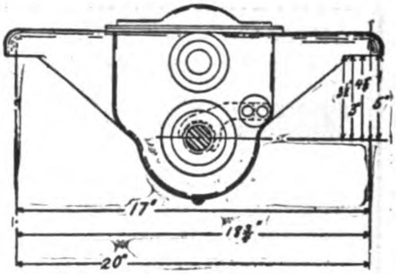


10 Transmission

# Every Impulse of the Motor is



carried straight to the driving wheels without loss of power by our TRANSMISSIONS. That is because they are made right. So excellent are they that we unhesitatingly guarantee quality and satisfactory service. We build selective type gears in three sizes, and at right prices. Also Planetary Gears

**SYRACUSE GEAR COMPANY, SYRACUSE, N. Y.**

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Volkcar-Janitor

# We Do Not Want Your Money

if you are not satisfied in every particular with the

# Volkcar Storage Battery

Our 6 volt 60 ampere hour battery will only cost you $18.90. Use it 60 days and if it does not meet your expectations in every way, return the battery and we will

## Refund Your Money

**CARPENTER & VOLKHARDT**

**2443 Michigan Ave. Chicago**

Class R—Constant Sight Feeds

# McCORD

## RADIATORS
## LUBRICATORS

"MARKS OF A GOOD MOTOR CAR"

**McCORD & CO., Old Colony Bldg., Chicago, Ill.**

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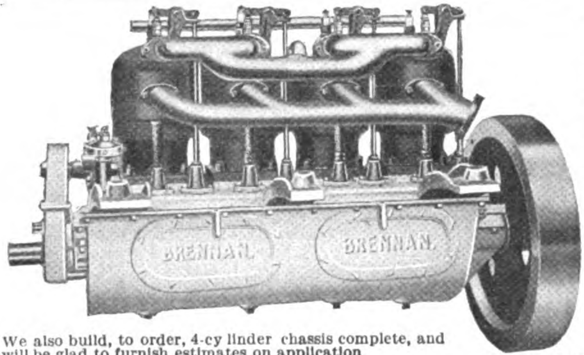

**A World-Wide Reputation for Absolute Reliability**

has developed a large demand for

## BRENNAN STANDARD MOTORS

Better get your 1909 orders to us early. Brennan Standards are flexible, powerful and wonderful hill-climbers

Furnished complete with transmission gear on sub-frame or pressed steel frames for any make of car. Made in the following models:

**2-Cylinder, 1909 special horizontal opposed, 5 x 5 annular ball bearings and 4$\frac{9}{16}$ x 5.**

**2-Cylinder, horizontal opposed, 5$\frac{1}{2}$ x 5, annular ball bearings.**

**4-Cylinder, 1909 special vertical, 4$\frac{9}{16}$ x 4, 4$\frac{9}{16}$ x 5.**

**4-Cylinder, vertical, 5 x 5.**

**4-Cylinder, vertical, 5$\frac{1}{2}$ x 6, also 6 x 6, and 7 x 6. 6 cyl., 4$\frac{9}{16}$ x 5.**

We also build, to order, 4-cylinder chassis complete, and will be glad to furnish estimates on application.
Further particulars are yours for the asking.

**BRENNAN MOTOR MFG. CO., Syracuse, N. Y.**

We will exhibit at the Ninth National Automobile Show, to be held at Madison Square Garden, N Y. City, Jan. 16th to 23d, Space No. 160.

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## VANADIUM STEEL CRANK SHAFTS & CONNECTING RODS

Made from our new secret process—with dry sand molds, giving much stronger material than forgings or bronze castings.

We have installed special machinery for finishing cranks, connecting rods and gears. We guarantee all of our material and workmanship.

Write for estimate on your requirements either from Blue Prints or your own patterns.

**NEW PROCESS STEEL CO.,** **Desk H,** **MARSHALL, MICH.**

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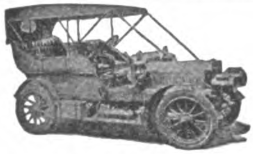

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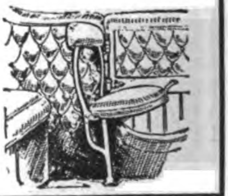
**Wind Shields, Rumble Seats, Tool Boxes, Body Upholstering, Cushions, etc.**

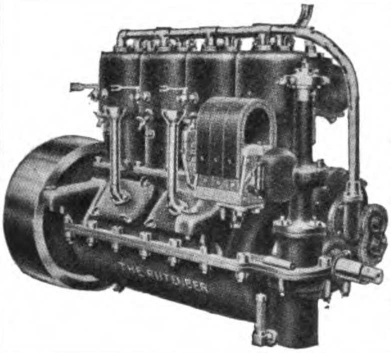
Only the Best, at right prices. Let us give you quotations.



## Twentieth Century Extra Seats

Made of the Best Machine Steel Entirely, to fit any auto. No cast or malleable material in any part. Easily folded, light, strong, durable. ASK US FOR CATALOG.

**F. W. ANDERSON & CO., Brown and Uber Sts., Phila.**



# RUTENBER MOTORS

The engines par excellence for those manufacturers who want power and reliability.

## FOUR AND SIX CYLINDER MODELS

the former in three sizes,—4 x 4, 4½ x 5, 4¾ x 5. Oil reservoir in base of crank-case. Six-cylinder,—4½ x 5, 50 H. P., all equipped for magneto.

**GET YOUR ORDERS IN EARLY**

**Rutenber Carburetors** are especially adapted to Rutenber motors, although they will give the best of service with all other kinds also.

**WESTERN MOTOR CO., :: Loganport, Ind.**

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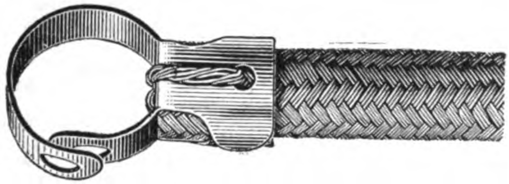
# INSTANTANEOUS TERMINALS



**for all**
**Electrical Connections**
**Perfect Contact**
**No Loose Nuts**
**Cheapest on the Market**

**Positive Grip** **No Soldering** **Fits all Connections**

**SEND 50 CENTS FOR BOX OF 10. POSTAGE PAID**

**MORGAN'S GARAGE - - - NEWPORT, R. I.**

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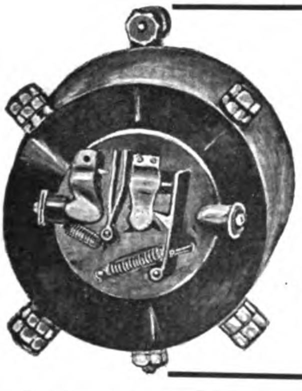

## *WHY?*

## HAVE TROUBLE WITH YOUR IGNITION?

# The Lundgren Ignition System

**is superior to, and has advantages over all others.**

## 4-cylinder, high-tension, distributer and contact maker

The points of merit of the Lundgren System are larger spark with less battery current. The contact maker requires no fine adjustment, is reliable at all speeds, and simple in construction. Spark the same at all speeds. High tension distributer constructed to avoid breakage in secondary current. Quicker break, consequently stronger spark and less advance needed.

Send for circular giving you full particulars of our complete ignition system.

**Lundgren Mfg. Co., 532 Real Estate Trust Bldg., Phila., Pa.**

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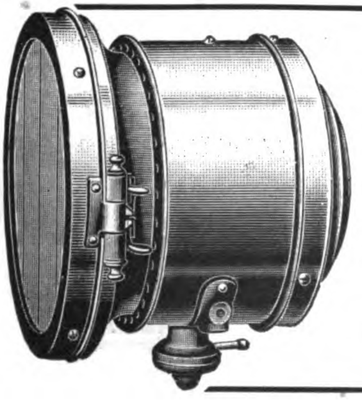
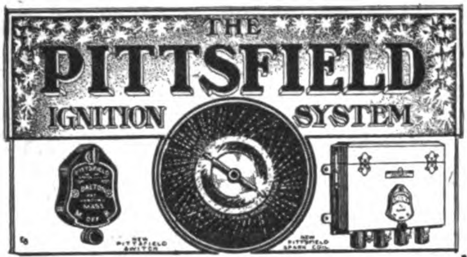


Your dealer can afford to give you the BEST Headlight; insist on having it.

# The ATLAS

with its superior ventilation and patent spring catch for the door, is the best Lamp made in the World. Take no other.

**NEW YORK AUTO LAMP COMPANY**
**585 Washington Street, New York**



Superior propelling power. **Does not drag** but **drives** car, boat or machinery.

Explodes the charges of all gas, gasoline and alcohol engines.

Invariably reliable and automatically positive. Sure in all the functions of the different elements.

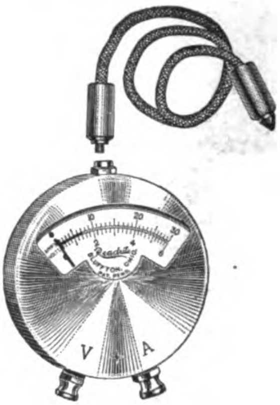
Pittsfield apparatus operates with unfailing certainty, meeting every demand, no matter how exacting or severe. Supplies with inevitable regularity the fierce hot sparks that give reliable and absolutely controllable force from the slowest to the swiftest speed.

The Pittsfield Switch is the foremost device of its kind Makes short circuiting of batteries impossible. Full information on request

**Pittsfield Spark Coil Co., Dalton, Mass.**
New York Sporting Goods Company,
17 Warren Street, New York, Distributors

*Readrite*

**POCKET BATTERY METERS**



**For reliable and accurate battery testing.**

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**The instrument which is absolutely guaranteed.**

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**Sold by the leading auto and electrical jobbers throughout the country.**

**AMMETERS (for dry cells)**
**0-30 Amps. - - - - - $2.50**
**VOLTMETERS**
**Up to 12 Volts - - - - - $3.00**
**COMBINATION VOLT-AMMETERS**
**Standard Range 8 Volt, 30 Amps. - $3.50**

**Coil-current Indicators.**
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***Write for circular and discount to dealers.***

**READRITE METER WORKS, Mfrs.**
**14 Main St., Bluffton, Ohio**

***USE***

**HAVOLINE**
**Automobile Lubricants**

HAVOLINE
AUTOMOBILE CYLINDER
OIL
HAVOLINE OIL COMPANY
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HAVOLINE

*"It Makes a Difference"*

Havoline Oils are filtered free from all carbon-producing impurities. They are the best made.

**Havoline Oil Co., 80 Broad St., N. Y. City**
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**JOHNSON SERVICE CO.**
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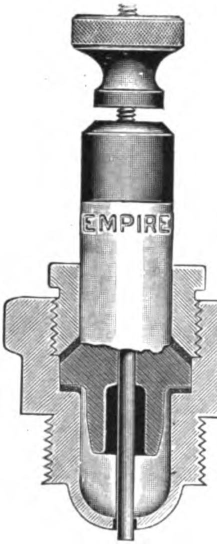
THERE ARE

HIGH PRICED PLUGS THAT ARE GOOD, AND LOW PRICED PLUGS THAT ARE NO GOOD, AND INCIDENTALLY SOME HIGH PRICED PLUGS THAT ARE NO GOOD.



Good material and workmanship count for little if the principal is wrong.

THE EMPIRE

combines the best principle with FIRST CLASS materials and workmanship.

PRICE lower than any approaching its quality.

A trial convinces that it is the best plug value offered.

$1.00 each by mail prepaid.

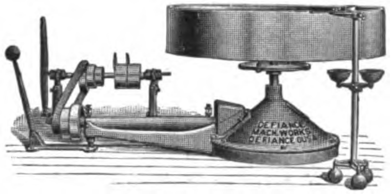
THE GRANT MFG. & MACHINE CO.
50 Silliman Avenue, Bridgeport, Conn.

Half the Pleasure is Taken Away from Motoring by Unbalanced Wheels.

The vibration is unpleasant and also destroys the bearings and other parts. This machine will give the wheels a perfect running balance.

Insist on your car being fitted with balanced wheels. Write the

Defiance Machine Works
Defiance, Ohio


DEFIANCE MACH. WORKS DEFIANCE, O.

AUTOMOBILE FLY-WHEEL BALANCER

FIRE-FLY
Ignition Batteries

GUARANTEED

BEST MADE

PRICES Rock Bottom

HOOSIER STORAGE BATTERY COMPANY
EVANSVILLE INDIANA

AUTOMOBILE

Cabinet Work

of all kinds

COIL BOXES BATTERY BOXES
UNIT BOXES TOOL BOXES
DASH BOARD BOXES

Made of any wood desired,—mahogany, walnut, cherry oak, and the more common woods.

Don't hesitate to entrust your orders to us. We have had several years' experience in the automobile line, and our product is sure to give satisfaction to you, as it has to many of the leading coil, battery and automobile manufacturers.

Send us your specifications, and let us quote you prices.

Standard Cabinet Mfg. Co.
Peru, Indiana

# DECARBONIZER

DECARBONIZER
THE GREAT
GAS AND GASOLINE ENGINE
RENOVATOR
CLEAN CYLINDERS
CLEAN PISTON RINGS
CLEAN VALVES
MORE POWER
MORE SPEED
LESS TROUBLE

The Great

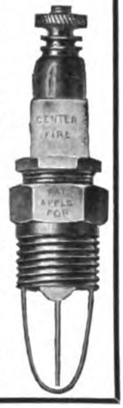
## Carbon Remover

Removes **CARBON** from all parts of engine. 100,000 **USERS** recommend it.

The only compound, **GUARANTEED HARMLESS. $1,000** Dollars **REWARD** if it can be shown that **DECARBONIZER** is **INJURIOUS.** Try a quart can at $1.50 and note increased power of engine.

## CENTER-FIRE

## Spark Plug


CENTER FIRE
PAT'S APPL'D FOR

With this Plug Combustion is Instantaneous and Complete.

10 per cent. **POWER** Increase **GUARANTEED.**

Samples $1.00, Six for $5.00. Regular price $1.50; discount to the trade. Fully Guaranteed.

**General Accumulator & Battery Co.**

**120 Second St., Milwaukee, Wis.**

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# Do You Want

## THE AGENCY

For the best gasoline car ever made for the money, and one as good as any at whatever price? Write

**JOHNSON SERVICE CO.**

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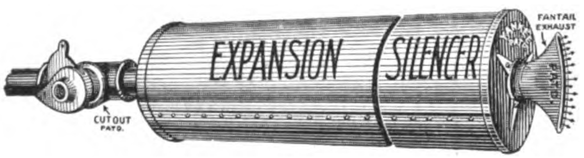
# THE VACUUM YANKEE SILENT MUFFLER


EXPANSION
SILENCER
FANTAIL EXHAUST
CUTOUT PAT'D.
PAT'D

**The only muffler made without back-pressure or noise at all speeds of the engine. Adapted for automobiles and marine use. Made of heavy galvanized iron, lined with asbestos and relined with steel, with riveted seams. The expansion chamber draws the burnt gases from the cylinder and prevents heating. Now used on every make of car and thousands of motor boats made in various sizes, from 1 to 100 H. P. engines. See that the YANKEE is on your car and it will save you unlimited trouble.**

**Write for free catalog.**

**Agents wanted.**

## THE YANKEE CO.,

**UTICA, NEW YORK, - - U. S. A.**

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# THE BEST SPRINGS MADE

**FROM**

## Crucible, Krupp and Vanadium Steels

**WE CAN HELP YOU ON YOUR DIFFICULT SPRING PROBLEMS**

## THE PERFECTION SPRING COMPANY

**2412 Superior Avenue, N. W. - - CLEVELAND, OHIO**

# SEAMLESS TUBING

## BRASS and COPPER

**Prompt Delivery**
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**Best Price**

**BUFFALO TUBE CO.**
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- 45 Touring Car Bodies, partially painted.
- 16 Dash Rails for same.
- 19 Gasoline Tanks for same.
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- 3 Acetylene Generators.
- 56 16″ Steering Wheels, with spiders, quadrant and levers.
- 3 3-Feed McCanna Oilers.
- 2 Type 19 St. Louis Motor Cars. List, $3000. New and guaranteed.

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TRADE MARK REGISTERED IN
NON-FLUID OILS
UNITED STATES PATENT OFFICE

# COLD WEATHER LUBRICATION

¶ NON-FLUID OILS are exactly what you need for winter lubrication. They do not get hard and stiff when the car stands. There is none of the heavy drag on the engine from stiff, congealed lubricant as when greases are used.

¶ NON-FLUID OILS retain their normal consistency winter and summer, because they are OILS. Never drip, never waste, never clog, never gum.

¶ Don't take a dissimilar product under a similar name. All packages of the genuine bear our name and trade mark. Samples free.

**NEW YORK & NEW JERSEY LUBRICANT COMPANY**
**Dept. D. 14-16 Church St., New York City**

The Rajah Spark Plug Hood

# "RAJAH"

## Ignition Absolutely Sure

Have stood the test for five years without any change in construction, none being found necessary.

No other Spark Plug made can show such a record.

**Quality is Our Motto**

**RAJAH AUTO-SUPPLY COMPANY**
**Bloomfield, New Jersey**
*(Watsessing Station, D. L. & W. R. R.)*

PACIFIC COAST AGENTS: Messrs. Hughson and Morton, 438 Market St., San Francisco: 1040 South Main St., Los Angeles, Cal., Portland, Oregon.
John Millen & Son, Limited, Montreal—Toronto—Vancouver

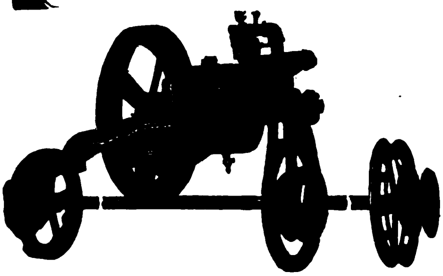
**The Philadelphia Battery has made Wonderful Records of Mileage**

THE PHILADELPHIA STORAGE BATTERY CO.
Emerald and Tioga Streets, Philadelphia, Penna.

Manufacture

STORAGE BATTERIES FOR COMMERCIAL AND PLEASURE VEHICLES AND HIGH POWER BATTERIES FOR LONG MILEAGE.

Owing to an increased demand for our product we have enlarged our capacity. We are represented in all the large cities of the U. S.



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**MORSE**

**Rocker Joint Chains**

in your cars. They are more efficient and wear longer.

**Morse Chain Co.**
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**Aluminum, Bronze,
Phosphor Bronze,
Manganese Bronze,
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**CASTINGS**

**Large or Small, Many or Few.**
Strictly High Grade Material
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*Prices Right*

**SYRACUSE ALUMINUM & BRONZE COMPANY,**
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THOMAS L. WETZEL, Eastern Sales Agent, 29 W. 42nd St., New York City

**Michigan Screw Company**

*Manufacturers of*

**Screw Machine Products**

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Don't take every grease for

**ALBANY GREASE**

**THE PERFECT LUBRICANT**

**For AUTOMOBILES,**

**MOTOR BOATS and MOTOR CYCLES**

Look for this Trade Mark on every package
Recommended by leading Auto Manufacturers

**SOLD BY SUPPLY DEALERS SAMPLES FREE**

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Send for booklet
"AUTO LUBRICATION," Free.

**ADAM COOK'S SONS, 313 West St., New York**

**CASTINGS**

IN
**ALUMINUM**
**BRASS**
**WHITE BRASS and**
**BRONZES of all kinds**

WE MAKE A SPECIALTY OF **CONTRACT WORK** OF ALL KINDS

**PIONEER BRASS WORKS, Indianapolis, Ind.**

**Graphite and Bronze**

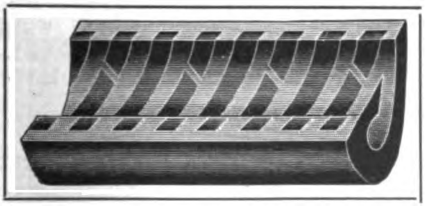
**BUSHINGS**

**BEARINGS** and

**WASHERS**

Run Without Oil or Grease, and

**Require no Attention**



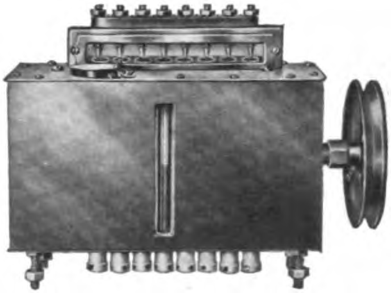
*Send for our new Descriptive Booklet*

**THE GRAPHITE LUBRICATING COMPANY**
12 Church St., Bound Brook, N. J., U. S. A.

**The "Sherwood"**

**FORCE SIGHT FEED OIL PUMP**

MODEL E
Bottom or Side Supports



Pulley or Direct Shaft Drive

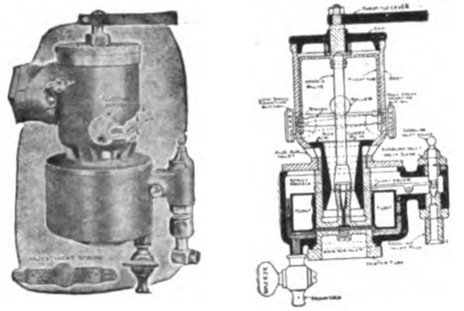
**Gives Positive and Uniform Feed**

RELIABLE and ECONOMICAL. Made of any capacity and number of feeds required. Manufactured by

**SHERWOOD MANUFACTURING CO.**
**Buffalo, New York**

Catalogue and Prices Furnished on Application

## The "SERVICE" BREEZE CARBURETER



Patents applied for.

**It's good in "Service" on any Motor**

Two buttons for all adjustments—the throttle does the work. The "SERVICE" adjustments are the simplest of any known; turn the one button marked "High" for perfect high speed results and turn the other button marked "Low" for perfect low speed results; THAT'S ALL. The adjustments then stay set.

The main and auxiliary air supplies are fixed, require no adjusting. The fuel cut-off, simplest made, fewest parts. The auxiliary air valve is away from dirt, water and oil; doesn't get stuck. The throttle operates a compensating fuel mixture. You don't need to study out how to do it. *Just turn a button and the throttle does the work.* Petcock for drainage.

Motor owners ask your dealer for a "SERVICE" Breeze Carbureter. If he hasn't got what you want, **write us direct.**

Entirely different from any other carbureter in looks, construction and results. It's compact.

**Send 10c for Text Book, "Carbureters and Engine Troubles."**

**Jobbers and Dealers wanted to handle our goods**
**Sales Agents wanted in Southern Territory**

**BREEZE CARBURETER COMPANY, 271 Halsey St., Newark, N.J.**

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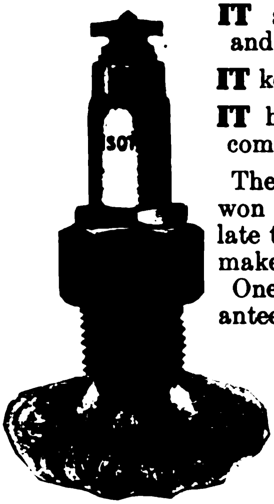
## Isotta Racing Magneto Plug

**Special for Racing, but can be used on any car if you want more speed and power**



**IT** stands heat and oil.

**IT** keeps clean.

**IT** has a Lavite composition core.

The Isotta has won more races of late than all other makes combined. One year's guarantee.

**Price**
**$2.00**

Write for catalogue

**ELI J. BUSHEY, Racing Plugs a Specialty**
**1777 Broadway New York City**

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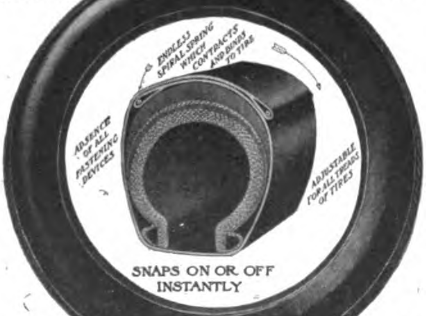
## HOPEWELL TIRE CASE

WATER PROOF ABSOLUTELY

PERFECT FITTING



ENDLESS SPIRAL SPRING WHICH CONTRACTS AND BINDS TO TIRE
ABSENCE OF ALL FASTENING DEVICES
ADJUSTABLE FOR ALL TREADS OF TIRES
SNAPS ON OR OFF INSTANTLY

EASY OF APPLICATION

NEAT APPEARANCE

**To adjust case, place end of case with label smoothly around tire, then wind remaining flap about tire and the spring ends will retain case in position.**

**PATENTED MAY 21, 1907, AND MARCH 10, 1908**

**We have just equipped 425 cabs of the New York Taxi Cab Co. with our cases which were purchased at an advanced price over all competitors.**

**HOPEWELL BROS.**

**CAMBRIDGE A., MASS.**

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## REMODEL YOUR MACHINE

BY FITTING IT WITH ONE OF THE

## "K&R" CONVERSION SETS FOR ANY MAKE OF MOTOR-CYCLE

which will not only bring your mount strictly up-to-date with the 1909 models, but will acquaint you with the REAL PLEASURE of MOTORING by the use of the **TWO SPEED**

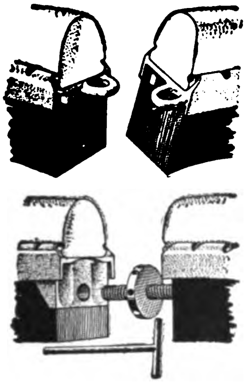
**FRICTION CLUTCH**
**FREE ENGINE**
**BAND BRAKE**
**HAND STARTING.**

All contained in the **REAR WHEEL** and operated by **FOOT LEVERS**

Its use will enable you to stop and re-start on any up-grade and climb the steepest hill.

Many other advantages explained in our **BOOKLET "K&R Conversion Sets."** Sent upon request.

**KELLER & RISQUE**
**ST. PAUL, MINN.**



# Half-Nelson Emergency Tire

**Prices greatly reduced for the New Year.** Sold direct to the consumer, and dealer's large discounts saved. **Half-Nelson** is the best, most reliable, and durable **Emergency Tire** ever offered. Ten days' trial. Money returned if not satisfactory.

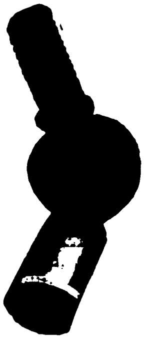
**HALF-NELSON TIRE CO.,** 1913 Portland Ave., Minneapolis, Minn., U.S.A.

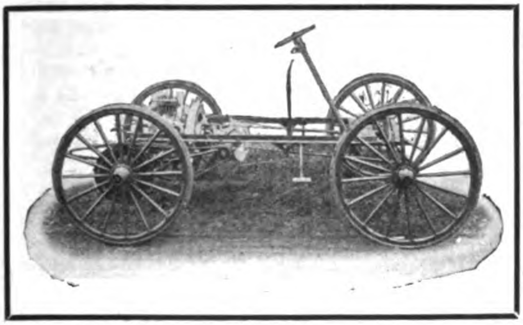
# Automobile Parts

**SPARK PLUG SHELLS**
**UNIVERSAL JOINTS**
**STEEL TAPER PINS**
**STEEL PLANER BOLTS**
**A. L. A. M. NUTS**
**WASHERS, ROLLERS**
**CLEVISES, CONES**
**TURNBUCKLES, STUDS**
**ALL KINDS OF SCREW MACHINE PRODUCTS**

**Patent Universal Joints for Commutator and Carburetor Control.**

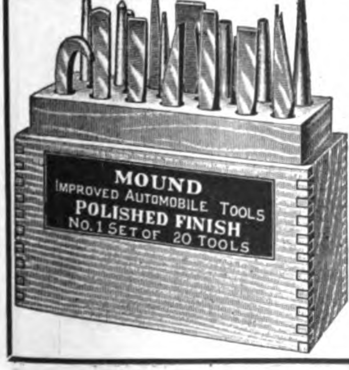
**PENINSULAR MILLED SCREW CO., Detroit, Michigan**





COMPLETE chassis or power equipments for runabouts, surreys or delivery wagons up to 1500 lbs. capacity. Double opposed air-cooled motors exclusively. Seven years of successful service is our guarantee. Not the cheapest, but the best. Catalog for the asking.

**TORBENSEN MOTOR CAR CO.**
Bloomfield, N. J.



# MOUND TOOLS

## For the Automobile

Cut represents our new set of 20 tools gotten up for use in auto repair work. Strictly high-grade tools with all the good points of tool-smithing in their make-up.

Conveniently arranged in finished oak case, and every tool is highly polished and guaranteed.

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|---|---|---|
| No. 1. | Set of 20 Tools - - - | $4.50 |
| No. 22. | Set of 6 Mound Hollow Ground Scraping Tools, Oak Case - | 3.00 |
| No. 25. | Set of 3 Carbon Scrapers - | 2.50 |
| No. 37. | Mound Valve Lifter | |

Send for Circular B

MOUND TOOL AND SCRAPER COMPANY, Toolsmiths
ST. LOUIS, MO., U. S. A.

**You Screw the Battery In—We've Done the Rest.**

# Patterson Wireless Dry Battery Holder

PATTERSON
WIRELESS
BATTERY HOLDER
MODEL FC-6
PATENTED

STEEL BATTERY BOX.

ADMITTEDLY the **BEST** Battery Equipment for Motor Cars, **BECAUSE**

1—**No Binding Posts or Wires**—setting up or renewal of battery as easy as an incandescent lamp—in fact, done in same way!

2—**Connections Can't Jar Loose!**—Contacts positive and instantly made.

3—Moulded rubber composition plate over rubber gasket waterproofs batteries absolutely.

4—Automatic bridge in each receptacle permits removal of an exhausted cell without interrupting circuit.

**You'll not bother with Storage Battery** after you've seen this Battery Box.

It's IDEAL! Each unit removable, even with your gloves on—no knowledge o electrical matters required. The MOST-TALKED-OF INVENTION in the electrical field.

**STANLEY & PATTERSON, 23 Murray St., New York**

"Columbia," "Eastern," "Nungesser Acme," "Stackpole," "Hi Up," "Red Seal," "Rock Island," "Westchester" Batteries now regularly made in this "Screw Top" Style; just specify "Patterson Screw Top." *Send for Bulletin 65.*

## Saves Hose, Saves Time, Saves Labor, No Cold Hands

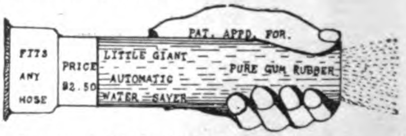
The only way to clean Vehicles is with the "Ideal" Carriage Washer
Price of Washer, without Overhead, $2.00
" Overhead Revolving Hose Arm, $12.00
Has decided advantage over all others.
Order now, will last a lifetime.

Ask for Catalog No. 6.

**"Ideal" Carriage Washer Co.**
ROCHESTER NEW YORK

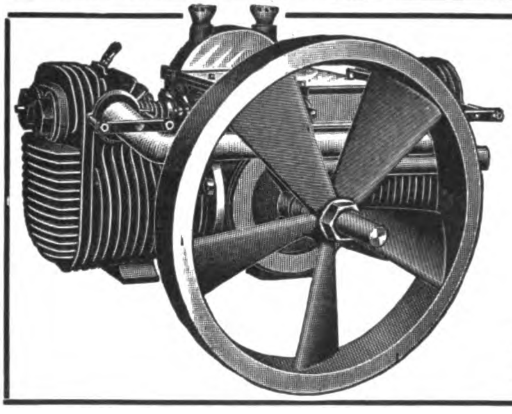
## Little Giant Automatic Water Saver

For Liveries and Garages. Cut water bills in half. Sent on 10 days' free trial to responsible parties; return, or pay for it.



Simply pinch the hose and valve opens, and closes automatically as soon as released. Order to-day.

**"Ideal" Carriage Washer Co.**
ROCHESTER NEW YORK



# WE BUILD

**a superb line of opposed air and water-cooled motors in sizes 4½ x 4¼, 4¾, x 4¾, 4¾ x 5 and 5 x 5 in. stroke. Also four-cylinder water-cooled in sizes 4¼ x 5 and 4¾ x 5 in. stroke and a special motor for generator purposes.**

***Booklet on application.***

**MONARCH MOTOR MFG. CO.**
**CHICAGO, ILL.**

CHAS. WEILAND
IMPORTER & JOBBER
HARDWARE & CUTLERY

AGENT FOR

# AUTOMOBILE TOOLS OF ALL KINDS FILES and HACK SAW BLADES

**WHOLESALE EXCLUSIVELY**

The largest exclusive wholesale dealer in the United States for all kinds of mechanics' tools. My specialties are Automobile Tool Kits, complete, Files and Hack Saw Blades. I issue a net price wholesale catalogue—no lists and puzzling discounts. Send for Catalogue A.

**CHAS. WEILAND**
147-149 CHAMBERS ST. 129-131 READE ST.
NEW YORK CITY

CHAS. WEILAND
IMPORTER & JOBBER
HARDWARE & CUTLERY

We Only Make

AUTOMOBILE AXLES
HUBS AND RIMS

**Hubs** BALL AND ROLLER BEARING

**Axles** FRONT AND REAR I-BEAM or TUBULAR

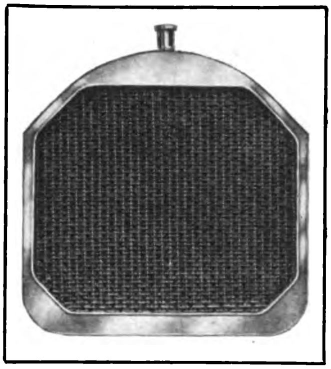
Bevel or Chain Driven

Doing this work as a specialty, with tools and equipment designed especially to the product made, gives us an advantage in cost of production that makes it possible to quote you interesting prices. May we?

SEND FOR CATALOG

**Weston Mott Co.**
Established 1884
FLINT, MICH.

**Acknowledged The Best**



**The Wright Cooler**

FIVE REASONS WHY

**Most Efficient** Cooler Made.
**Strongest** Cooler Made.
**Freezing** Don't Hurt It.
**Handsome** in Appearance.
**Guaranteed to Cool**
Any Motor it is Built for.

*Write to Wright for Catalogue*
WRIGHT COOLER & HOOD MFG. CO.
Chicago, Ill.

SX
FOR AUTOMOBILES
Gas & Marine Engines
THE LUTZ-LOCKWOOD MFG.

No. 6

**S. X. Ignition Dry Cell**

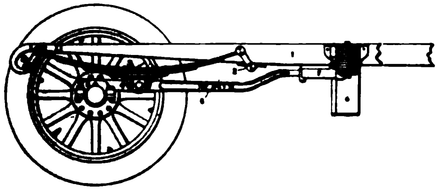
BEST FOR SPARKING

Voltage, 1.6 Volts

Initial Amperage, 28 to 35

EFFICIENCY GUARANTEED

**Lutz Lockwood Mfg. Co.,** 39 Cortlandt St.
NEW YORK



**THE AUTO THAT LASTS THE LONGEST** no matter what make, what horse power, or for what purpose used, is the car that is fitted with

**STOLP'S GUARANTEED SHOCK ELIMINATOR**

20,000 MILES of practical experience of which 12,000 WAS ON SOLID TIRES. 40 MILES per hour on solid tires with safety and comfort.

**HOW IT IS DONE.** When the wheel strikes a depression or elevation in the road bed, the lever oscillates and the shock is transmitted into the springs in two opposing forces, one pushing up and the other pulling down. This holds the body of the car in its normal position. Write for full particulars.

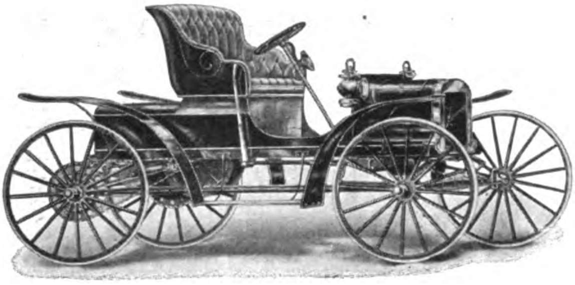
**OSCAR STOLP, 20-22 Fletcher St., N. Y.**

Packard Ignition Cable

**Is Always There**

PACKARD QUALITY MEANS SOMETHING. Ask any user—not us. Send for new booklet, in colors, just out.

THE PACKARD ELECTRIC COMPANY, 300 Dana Avenue, Warren, Ohio

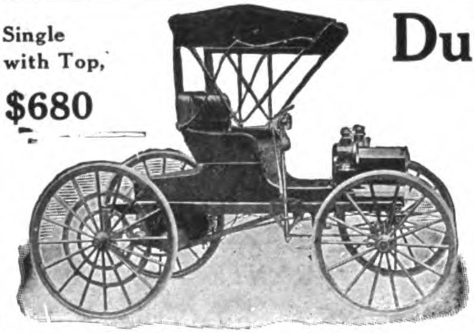


**The Zimmerman Auto-Runabout**

BOTH PLANETARY AND FRICTION DRIVE

Write for Circular No. 18 **ZIMMERMAN MFG. CO., Auburn, Ind.**

Single with Top, $680



See it on N. Y. Streets and at A. M. C. M. A. Show

**Duryea's Buggyaut**

The simplest ever seen. No ropes, chains, cams, gears valve lifts or extra shafts. 2-cycle engine, air cooled. 2 cylinder, giving an impulse each half revolution Less than half the parts usually found. All drives direct. Also 4-passenger and delivery vehicles.

**CHAS. C. DURYEA, Reading, Pa.**

IDEAL SWITCH CO
PLAINVILLE CONN.
BAT
MAG
PAT
IDEAL

No. 500 Auto, Sample $1.00

Ideal Automobile, Boat and Ignition Switches are the only Switches having self-locking contacts, which are safe and sure. Every one guaranteed. Send for folders describing and illustrating same.

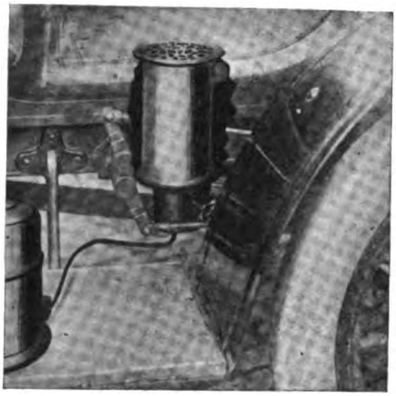
No. 423, Sample 50c.

**Ideal Switch Co., Plainville, Conn.**

J. D. KEARNEY,
Monadnock Block, Chicago, Ill.

F. R. MORSE,
335 Broadway, New York City, N. Y.
NEW YORK and VICINITY

## Wagenhals Motor Car Heater



**An innovation in motor car heating**
**No experiment**

A miniature hot air furnace; will maintain temperature of 70 deg. in coldest weather. Operating expense, 1 cent per hour. Installed in 15 minutes. A big seller.

Agents wanted. Season short, act quick
For particulars:

**WAGENHALS MANUFACTURING CO.**
**4569 Washington Ave., St. Louis, Mo.**

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## The Essex Carburetor

**Perfectly Automatic under all conditions of atmosphere or speed of engine. Write for prices, and results will be a surprise to you.**

**Essex Brass Foundry Company**
**AMESBURY - - - - MASSACHUSETTS**

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### HEADQUARTERS FOR

# FIAT

## Parts and Repairs

AS SUCCESSORS to Hollander and Tangeman, the original importers of FIAT Automobiles, we have continued to maintain their large stockroom of FIAT parts and have retained their special force of factory-trained mechanicians for FIAT repairs.

We are in a position to give prompt and efficient service to owners of 1904, 1905, 1906, 1907 and 1908 models.

**THE HOL-TAN CO.**
**244 West 49th St., New York City**

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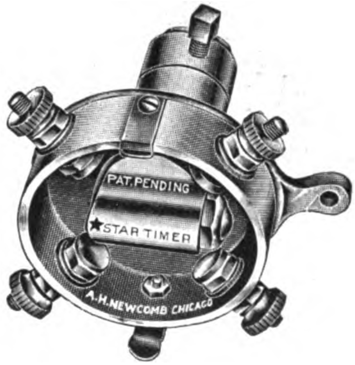
## "STAR" TIMER



(Patent pending)

Self-adjustable; runs in either direction and at any speed. Dust-proof and water-tight, and contains fewer parts than other makes. All working parts are adjustable.

With the STAR TIMER you use 50% less current than with any other. Guaranteed free from defects in either material or workmanship.

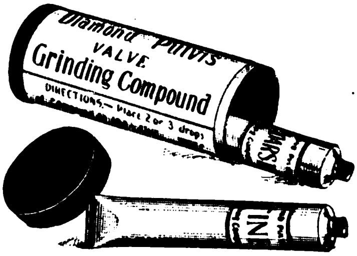
Made for one, two, four, six or eight cylinders.

Write for prices. Liberal discounts to dealers.

**A. H. NEWCOMB**
DEPT B
**815 W. 21st St. CHICAGO, ILL.**

## DIAMOND PULVIS VALVE GRINDING COMPOUND

**THE BEST AT ANY PRICE**



**The Only First Class Grind at 25c**

**Because**

Put up in collapsible tubes, it is always moist.
No waste. Will not drop into cylinder.
No emery or ground glass.
Does not touch hands when applied.
Cannot gather dust.
Cuts rapidly and smoothly and leaves valve in perfect condition.
Used today by thousands with PERFECT SATISFACTION.

**Sold by leading jobbers**

**EMPIRE SALES CO., Distributors**
**201 W. 106th St., NEW YORK**

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## "K. C."

## "Kitsee Changeable"

**DRY STORAGE BATTERY**

**Would a Sparking Battery with**

## A Life Guarantee

**Interest You?**

**Would you like a battery that you could exchange when discharged for a fully charged battery with any dealer, regardless of where purchased, by paying 35 Cents per Cell and without the annoyance of delay? Then ask your dealer about it or write us.**

## SEE EXHIBIT

**at Madison Square Garden**
**JANUARY 16-23, 1909**
**EBEN L. BEVAN, Genl. Sales Agent**

**KITSEE STORAGE BATTERY CO.**
**628-629 Connell Bldg., SCRANTON, PA.**

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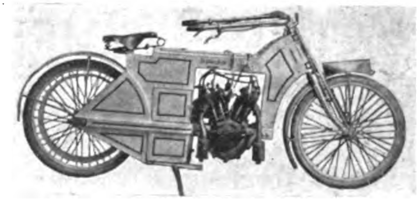

## MIDGET BI-CAR

The most comfortable Motorcycle produced. Built like a car. Agents better hear our proposition before closing contracts.

**Walton Motor Co. (Inc.)**
**Lynbrook, Long Island**
**Sole Licensees and Manufacturers**

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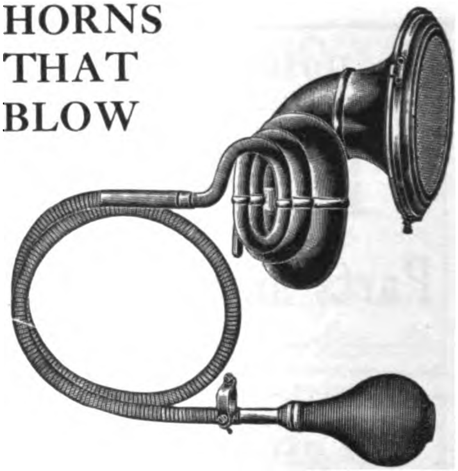
## HORNS THAT BLOW



## R-K Reeds are Best Made

**OLDEST AUTO HORN MANUFACTURERS IN U. S.**

**Fifty Styles for Bicycles, Motorcycles and Automobiles**

Manufacturers and Jobbers send for 1909 Catalogue

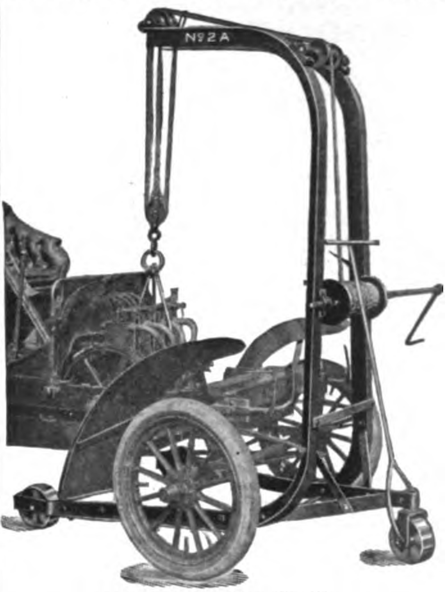
**THE RILEY-KLOTZ MFG. CO.**
**17 Mulberry St., Newark, N. J.**

**The simplest car of the high-wheeled type now on the market**

*Write for catalogue and prices of our* 1909 *Friction Drive Car*

**THE BUGGYCAR CO.**
(INCORPORATED)
CINCINNATI, OHIO

## Hercules Portable Crane Hoist



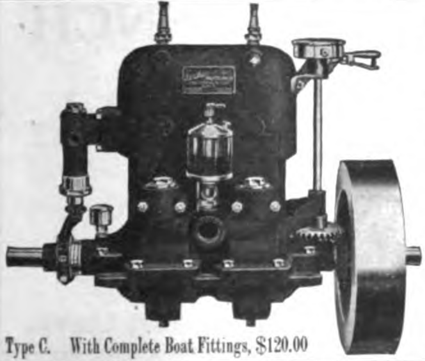
Patented December 19, 1905.
See how easy it does it. Fills the bill for Automobile Factory and Garage Crane. Many of them using it. You should.

**WILLIAM S. NICHOLLS**
252 BROADWAY NEW YORK

A SPECIALTY

# CRUCIBLE STEEL CASTINGS FOR AUTOMOBILES

**LEBANON STEEL CASTING CO.**
**LEBANON, PA.**



Type C. With Complete Boat Fittings, $120.00

## LOCKWOOD-ASH MARINE MOTORS

**The quality is there before the name is attached**

**Sizes 2 to 12 H. P., one, two and four cylinder**

**WORKMANSHIP, MATERIAL AND SATISFACTION GUARANTEED**

IVE AGENTS WANTED IN UNOCCUPIED TERRITORY
WRITE FOR OUR CATALOGUE

**LOCKWOOD-ASH MOTOR CO.**
**Cor. Horton and Main Sts., JACKSON, MICH.**
Eastern representative: E. J. WILLIS & CO., NEW YORK
Western representative: W. H. GOSCH, DAVENPORT, IOWA

YOU SAVE AN AVERAGE OF 35% WHEN YOU BUY FROM US
35%
AUTOMOBILE SUPPLY CO
NEW YORK
A. B. NORWALK PRES.

## Automobile Owner

If you are tired paying the usual high list prices for Auto Supplies, write for our 35% catalog.

**35% Automobile Supply Co.**

**97 Chambers St., New York**

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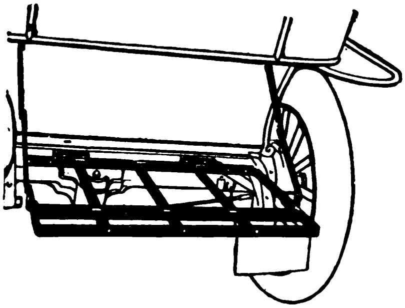

## Double and Single Fold
## Trunk Racks

For the Jobber, Manufacturer and Dealer.

Our racks fit any car,
and are built for service.

Our prices will interest you. Write us.

**POLLARD AUTO CO., NASHUA, N. H.**

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# DOW TUBES

"We don't believe the blooming old tubes ever wear out."
Plainfield Motor Car Co.

"After a year of experience I am thoroughly pleased with Dow Tubes."
J. H. Stevenson (Panhard and Levassor), Berkeley, Cal.

"Worth five times the price of ordinary tubes."
C. A. Lester

**The Best Tubes Ever Manufactured**
**Are The Most Economical**
**Do Not Deflate When Punctured**

**DOW TIRE COMPANY**

**Phila. Distributors: Auto Light and Motor Supply Co.**

**2000 Broadway, New York** **889 Boylston St., Boston**

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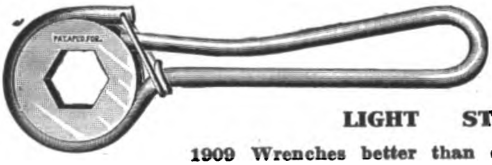
## WALDEN RATCHET WRENCH



For TIRE LUGS
SPARK PLUGS
and GENERAL SERVICE

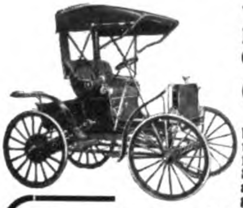
**LIGHT STRONG RELIABLE**

1909 Wrenches better than **ever. Heavier handles. Stronger tool. Better made. Nickel finish.**

**Lug Wrenches, - 35c. each**
**Spark Plug Wrenches, 75c. each**

**All sizes in Hexagon and Square opening**

**WALDEN MFG. CO., 67 Deacon St., Worcester, Mass.**



**Write for This Book on This Full 18-20 Horse Power Car That Always**

## Goes The Route

Not "an engine in a buggy" but built up from highest type Chassis carrying powerful water-cooled motor. Speed 1 to 30 miles. Goes average 25 miles on 1 gallon gasoline.

## The Invincible SCHACHT

Handsome lines and finish—regular auto appearance—High wheel style best for all roads—sand, mud and mountain climbing. Economy of first cost and long life—durability. Quick control from Steering Wheel—Friction drive—Double chain to each rear wheel—Absolutely gearless and clutchless—Puncture-proof Goodrich solid rubber tires—Timken roller bearings—Schebler Carburetor, etc.,—All of very highest quality.

Write for prices—free books or Special Offer to Agents.

We will exhibit at the New York Show, December 31 to January 7, and at the Chicago Show, February 6 to 13.

**THE SCHACHT MFG. CO., 2705 Spring Grove Ave., Cincinnati, Ohio**

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## GRAY MOTORS

**$2\frac{1}{2}$ H. P. Engine with complete Boat Outfit** (not bare) everything ready to install in your boat, except gasolene tank and piping. Guaranteed to develop MORE than 3½ h.p.—in fact it is as powerful as most 4 horse-power engines. **$67.50**

**1, 2, 3 and 4 Cylinders**
**2½ to 40 h. p.**

We have the largest plant in the world devoted exclusively to building 2-cycle engines, (5 stories high) equipped with exactly the same machinery used in building the high grade automobiles. Despite their low price, Gray Motors are strictly high grade in EVERY feature. Write today for interesting story of the 200 mile long distance race on Lake Erie, also 1908 catalog.

**GRAY MOTOR CO.** 28 Leib St., Detroit, Mich.

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## CORBIN

For—**ABILITY**—Note our Hill Climb Records.
**ENDURANCE**—Note our Kansas City perfect score.
**SATISFACTION**—Consult our customers.
**APPEARANCE—SEE OUR CAR.**

**Corbin Motor Vehicle Corporation**
**New Britain, Conn.**

***We will exhibit at Madison Square Garden Show, January 16-23, 1909.***

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## Rotary Pumps

FOR circulation of Water and Oil on Automobile, Marine or Stationary Engines and for bilge purposes. All sizes and capacities.

*SEND FOR CATALOGUE*

**The Lipman Mfg. Co.**
**206 Pleasant St., BELOIT, WIS.**

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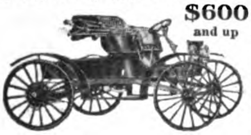
## Eureka Motor Buggy

Different from any other Motor Buggy on the market. Built to **endure** and to **run.** Does not go to pieces in a season—lasts for years.



**$600** and up

Operates at one-fifth the cost of an ordinary automobile. Climbs hills, goes over any road—muddy, rough or sandy, and speeds up to 30 miles per hour.

### Consider This Equipment

12 h. p., 2-cylinder opposed 4-cycle, air-cooled engine; double drive; best ball bearing axles; wide auto seat; full leather quarter, three bow top and back curtains; rubber side curtains; best quality horn; 2 brass oil lamps; mud fender and running boards. It's guaranteed. Write for testimonials and Catalogue. Special Offer to Agents.

**EUREKA MOTOR BUGGY MFG. CO.**
Dept. L. St. Louis, Mo

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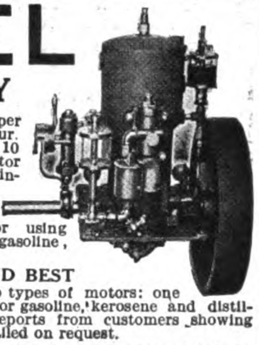
## FUEL ECONOMY



Less than ½ of a pint per horse power per hour. Less than 6 gallons in 10 hours for a 6 H. P. motor is a record that will interest you, because it is a money saver.

Possible only in our special generator for using either kerosene or gasoline, making our motor the

**CHEAPEST AND BEST**

We manufacture two types of motors: one for gasoline only, one for gasoline, kerosene and distillate. Catalog and reports from customers showing wonderful economy mailed on request.

DU BRIE Motor Co., 436 Guoin St., Detroit, Mich.

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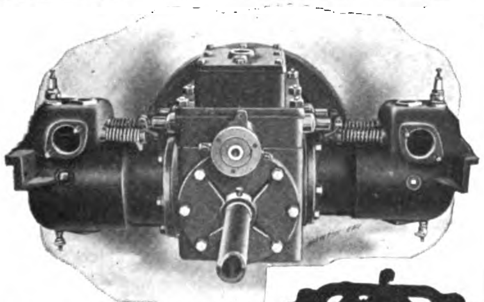

## DON'T BUY A MOTOR

UNTIL YOU GET OUR CIRCULAR AND PRICES

**AUTO PARTS CO., 52 W. Jackson Boulevard, Chicago**

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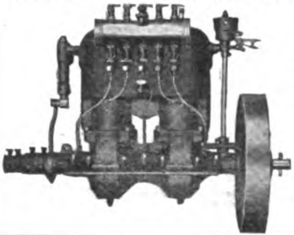
## MAKE A MOTOR BOAT OF ANY BOAT IN FIVE MINUTES

with our *Out Board* or *Porto Motor*. One of these, on an ordinary *Sixteen-foot Rowboat*, won the Labor Day *Motor Boat Race* at Roslindale, Mass., against launches of the regular type. We build Canoe Motors in 1, 2, 3 and 4 cylinders. For launches, we have our Model A motors.



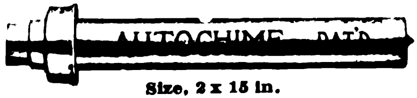
One of these won the Motor Boat Race at the Fisheries Exposition at Trondhjem, Norway.

Write for catalogs.

**WATERMAN**
**Marine Motor Co.**
**1513 Fort Street, W.,**
**Detroit, Mich.**

**OST POPULAR AND PRACTICAL EXHAUST HORN MADE**

**Price, $10.00** Including valve and foot pedal



**Size, 2 x 15 in.**

**Perfected in Every Detail**

ach horn tuned and tested by Musical Instrument Experts. A
ow gentle warning or a powerful, road-clearing blast may be
iven at will. When ordering give O. D. of Exhaust Pipe. If pipe
over 2 in. add $1.50 for special valve. Address Autochime Dept.

**Gray-Hawley Mfg. Co., Detroit, Mich.**

We make Motor Boat Whistle Outfits. Write Us.

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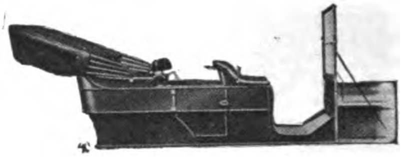
**BODIES**

**Of all descriptions for manufacturers. In the White or Painted and Trimmed**



**No. 116. Fully Equipped, 7 passenger Body.**

We specialize building Bodies for Automobiles only, and have ample and competent facilities to assure satisfaction as well as prices.

Write us for folder of our Windshield.

**The Barndt-Johnston Auto Supply Company, Columbus, Ohio**

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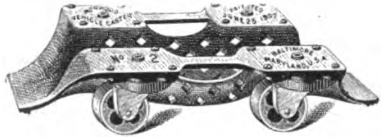
**Norwood Portable Turntable or Caster**

**For Automobiles** **Patented, June 25, '07**



Made in one piece. Cars can be run on or off from either end; a very desirable feature. Patented; beware of imitators. One man can handle largest cars with ease. Indispensable for Garage, Factory, Depot, etc.

We hold **Valid Patent** and will protect our customers. Don't be deceived, buy the best.

For sale by largest jobbers and dealers in U. S. and abroad. Discount to the trade.

**Auto & Accessories Mfg. Co., 1416 Madison Ave., Baltimore, Md.**

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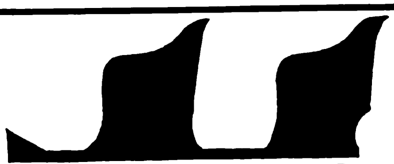

**Automobile Bodies**

TOURING CAR
LIMOUSINE
AUTO BUGGY
TOWN CAR
ROADSTER
RUNABOUT
TAXICAB

**Wind Shields a Specialty**

**THE FRANTZ BODY MFG. CO.**
**Akron, Ohio**

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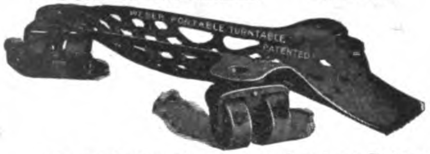
**WEBER PORTABLE TURN-TABLE TRUCKS**

**FOR AUTOMOBILES** **Patented**



The U. S. Court has just declared our Patent good and valid in suit against the Pikes Peak Manufacturing Co. We have started suit against "Norwood" for infringing. The only sure way of buying an Auto Turn-Table or Truck is to see that they are branded "The Weber Portable Turn-Table Truck." Factory, Muncie, Ind. For sale by all jobbers. All orders to be sent to headquarters.

THE WEBER CYCLE & SUPPLY CO., Colorado Springs, Colo.

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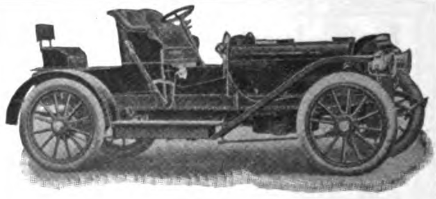

**LANE STEAM ROADSTER**

We will be at the New York Show, Grand Central Palace, Dec 31st. BE SURE to see our various models.

Lane Motor Vehicle Co., Poughkeepsie, N. Y.

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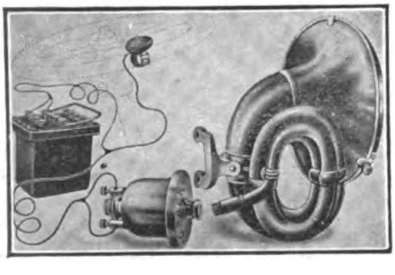

**CRACK-UNICUM ELECTRIC HORN**

*Far superior to the old style pneumatic horn.*
*Write for Bulletin No. 16.*

**Theo. H. Gary Co., 52 Franklin St., New York**

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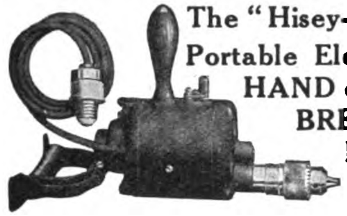
**"6-25" For Auto Ignition, Price $11.50**

The success of the **CHAMPION ACCUMULATOR** lies in the construction of the Plates. They are thick and strong and the ACTIVE MATERIAL is enclosed. Cannot short-circuit. Never need cleaning out. Bulletin "G" tells all about them.

**HECTOR MacRAE, 314 St. Paul Street, Baltimore Md.**

**SHOP OR GARAGE**



The "Hisey-Wolf"
Portable Electrical
HAND or
BREAST
DRILL

Can be carried anywhere. Made in sizes, ¼ in., ⅜ in., ½ in., ¾ in. capacities. Weighs 8 to 19 pounds respectively. Power from any lamp socket direct or alternating current. Sent on trial. Also Portable Electric Grinders of all kinds.

**The Hisey-Wolf Machine Co., CINCINNATI, OHIO**

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# THE 3 BEST

Divided

# Wind Shields

VOLTZ BEECHER
SCHILDBACK

*A shield for everyone. Write for prices.*

**Limousine Carriage Mfg. Co.**
3515 Michigan Avenue - Chicago

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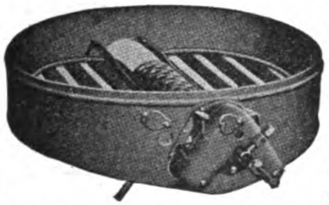
**THE BURNER is the SOUL of a Steam Carriage**



THE
NATIONAL
KEROSENE
OIL BURNER
HAS NO PEER.

It fills the exact requirements of Steam Carriage owners. Safe, reliable, economical, the best in the world. Hundreds of well-pleased users testify to its merits. Send to us for descriptive matter and published names of users. We supply catalog giving new and important improvements.
PRICES REDUCED. Write to
**Judson L. Thomson Mfg. Co., Owners & Makers, Waltham, Mass.**

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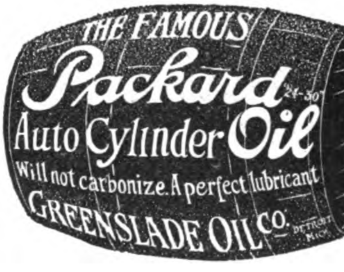

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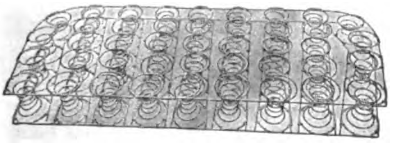

This Soft Edge Cushion Spring is used by nearly all of the leading Automobile Manufacturers.

It has been tried for years and stood the test.

Let us figure with you.

**NATIONAL SPRING & WIRE CO.**
**Albion, Mich. St. Catharines, Ont.**

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WHEEL WORKS
JOHN E. JONES, Prop.
Manufacturer and
Repairer of
**Artillery Wood Wheels for Automobiles and the Perfection Wheel Puller**

Specially designed spokes give more strength and a natty appearance.

Our specialty is making wheels without hubs.

LET US FIGURE ON YOUR REQUIREMENTS
72 South Street - Utica N. Y.

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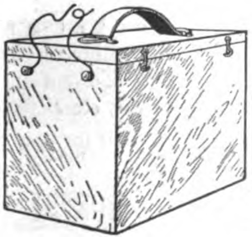
**A 6 Volt, 60 Ampere Battery**



Selling regularly
at $27.50
**$7.50**
while they last.
Special discount
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Will exhibit at
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**S. BREAKSTONE**
900 Fisher Bldg.
CHICAGO, ILL.

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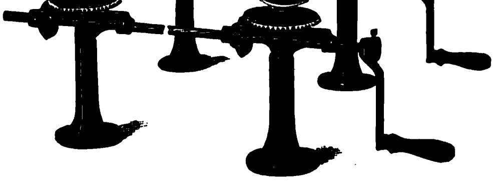
# The Springfield Lift

**Saves tires and eliminates the dangerous pit.**
**Let us tell you about it.**

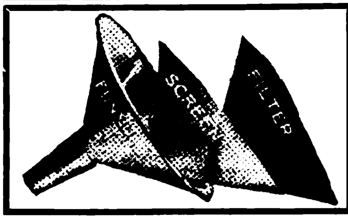


**THE SHAWVER COMPANY, Springfield, O.**

WE CONTRACT TO BUILD ALL KINDS OF **MACHINES AND AUTOMOBILE PARTS**

SPECIAL MACHINES, TOOLS AND DIES MADE TO ORDER

**THE WADE MACHINE COMPANY, 133 Oliver Street, Boston, Mass.**



**The D. A. G. Gasoline Filter**

Absolutely removes both free and combined water, dirt and all impurities from gasoline. Very rapid, will last years. Sent to any part of the U. S., prepaid; $1.00 for touring size; $1.25 for garage size.

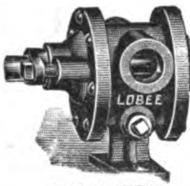
**DENVER AUTO GOODS CO.**

Sole Manufacturers, DENVER, COLO.

**A CLEAN SCORE** At the Importers' Automobile Salon, Madison Square Garden, New York, January, 1908

**100%** OF THE EXHIBITORS FINISHED WITH **VALENTINES VARNISHES**

**VALENTINE & COMPANY** NEW YORK CHICAGO BOSTON PARIS AMSTERDAM TORONTO



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**Lobee Circulating and Bilge Pumps**

have a train of satisfied users everywhere. If you want good circulation on your Automobile, Launch or Motor Boat, use a LOBEE PUMP.

Write for circular and prices.

**Lobee Pump and Machinery Company**

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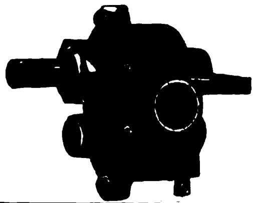

**The PLUG with a Reputation**

**Mr. User of Plugs:**

Insist on NEVER-MISS when you ask for a plug.

**Mr. Dealer in Plugs:**

Write us for catalog and discount; we have a good proposition for you.

We also manufacture

AMMETERS
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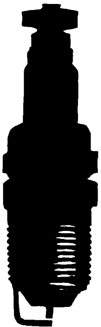
CHAIN TOOLS, Etc.

**Never-Miss Spark Plug Co.**

Lansing, Michigan



**Manufacturers:**

As this will be a short season, Protect Yourselves Now. Send us your blueprints and let us submit a sample

**STEERING GEAR**

Then when the rush comes all you need say is Go Ahead. We will ship your gears promptly and you can be sure the Quality Will Be Right.

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Sales Agents, Brandenburg & Co.,
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**WIND SHIELDS**

For AUTOMOBILES
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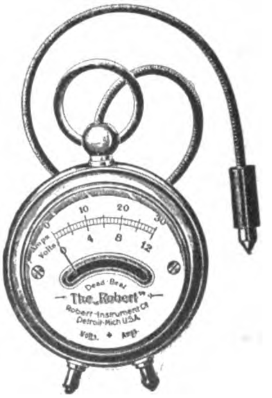
For high quality and low price write to

**HENRY E. MEYER**

17 Duffield St. DETROIT, MICH.



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Send for one today.

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GRAY MUFFLER
THE GRAY-HAWLEY MFG. CO.
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"BETTER THAN EVER"
New Models, Sizes and Prices

A Perfect Muffler for any size or type motor. Efficiency, Satisfaction and Delivery Guaranteed. Samples submitted for testing. Write today for Catalog T. J.

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Makers of The Gray Autochime, (the original and most Practical Exhaust Blown Horn) and other high grade
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INVINCIBLE

INVINCIBLE No. 620
Voltage—6
Capacity—20 Ampere-Hours
Price $10

The "INVINCIBLE" is strictly an up-to-date ignition battery, high grade in all respects, yet low in price. Made in all sizes.

It will pay you to send for our instruction booklet on the subject of ignition batteries.

We make a full line of electric vehicle cells, also electrolytic rectifiers for charging from an alternating current circuit. Inquiries solicited.

American Battery Co.
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Established 1889

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REGISTERED IN PATENT OFFICES UNITED STATES CANADA AND GREAT BRITAIN.
GAS ENGINE LUBRICANT
MANUFACTURED ONLY BY
E. H. KELLOGG & CO.
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IS THE BEST FOR
AUTOMOBILES AND MOTOR BOATS

SOMETHING NEW
Brown Tire
Pressure Indicator

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THE BROWN CO.
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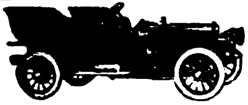
registers accurately the pounds pressure in your tires. Simple, practical, automatic. Recommended by all tire manufacturers. Price, $3.00 Ask for demonstration at Palace Show.

THE BROWN CO., 509 E. Water St., Syracuse, N. Y.



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Auto Equipments and Supplies
HAVE YOU OUR CATALOG?
TIME AND MONEY SAVED
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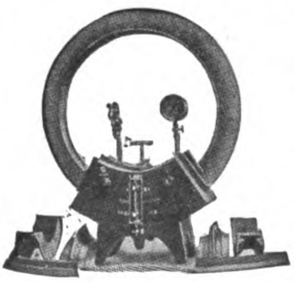

The kind rubber factories use for all kinds of Automobile tire and tube repairing and retreading, also special devices such as large kettle vulcanizers, tread rollers, power wrapping machines, segment recovering cores, air bags and adjustable sectional vulcanizers, steam jacketed. This vulcanizer will repair 33 sizes and makes of casings. Tires sold and repaired reasonably.

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THE NEW THREE-ARMED
CRANE PULLER
Has Many Advantages

Propellers, Auto Wheels, Etc., Removed Without Damage

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ANYBODY
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The latest portable vulcanizer out; electric, gas or gasoline heated; has four faces; swivel yoke; makes a patch 3" x 5" any place on a tire and on any sized tire. Booklet on tire preservation by addressing the

STITCH NINE VULC. CO.,
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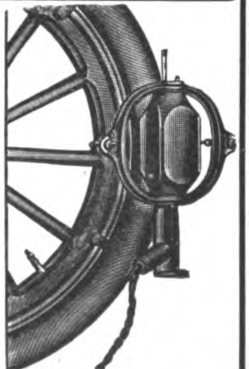
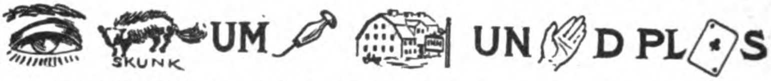


NO MORE CUSS WORDS IN THE DARK



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IF YOU CAN GET YOUR HAND ON IT YOU CAN PUT THE OIL IN
European Agents, CHARLES CHURCHILL & CO., LONDON, ENG. *SEND FOR SAMPLES*
BAY STATE STAMPING CO., WORCESTER, MASS
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SIMPLICITY RECTIFIER
FOR
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DURABLE SIMPLE
COMPACT SAFE
EFFICIENT FIREPROOF

THE AUTO & SUPPLY MFG. CO.
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1907 Thomas Cars, $900 to $1400.
Olds, $750 to $1200.
Pierce, $750 to $1250.
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500 others,—$100 up.
Closed Bodies—100 in stock to fit any and all makes, $200 to $900.

Broadway Automobile Exchange,
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SPRING DRIVE IS AS NECESSARY AS SPRING SUSPENSION

We can convert your rigid shaft into an elastic one at small cost, which will prolong the life of your car, save tires and repairs, and add pleasure to driving. We can also supply parts and drawings so that any machinist can convert it for you.

Estimates furnished on application.

ALEXANDER & COX COMPANY
Ogden and Western Aves., Chicago

*See January number of this Journal*

THE ECHO HORN
furnished complete with pedal, spring, cable and self-cleaning valve. Price $20.00. Write for our new booklet and quotations.

THE ECHO HORN COMPANY
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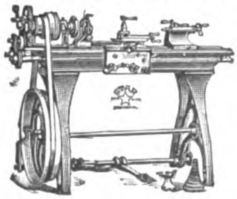
FACTORY SALES CORPN., Western Distributers, Chicago, Ill.

"Star Lathes"
Foot or Power 9-in. to 16-in. swing



High-grade screw-cutter engine, Lathes, with or without compound rest taper, draw-in, chuck-milling and gear-cutting attachments, friction countershaft, metric lead screw, etc.

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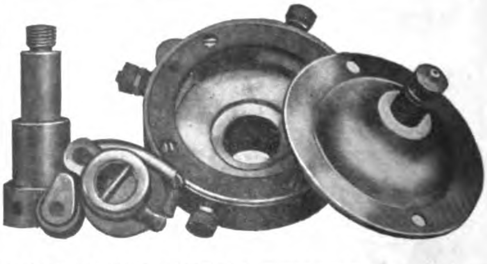

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60 WOODBRIDGE STREET, DETROIT, MICH.
Manufacturers AUTO and MARINE TIMERS
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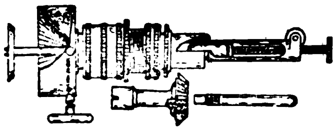
BULTMAN MODEL R STEERING GEAR
FOR RUNABOUTS AND AUTO-BUGGIES
THE F. H. BULTMAN CO., CLEVELAND, O.

**Crone** { Valve Dresser and Reseater
Priming Pump
Emergency Wheel



This valve seating tool had been used in the entrance of the Protos (German) car in New York to Paris race.

*Write for Catalogue and Prices*

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**"STANDARD" AUTO GAUGES**

For any pressure used in automobile practice.
We make more Auto Gauges than all other manufacturers combined.
Get our prices.
Catalog K 3.
"They do the work."

**THE INDUSTRIAL INSTRUMENT CO.**
Sales Co. for
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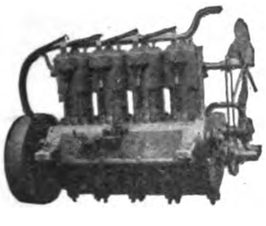
Foxboro, Mass., U. S. A.
NEW YORK CHICAGO

**TAKE NOTICE** When you buy, buy the BEST, and order one of

**PIGGINS BROS. MOTORS**



A new design in motors for autos, trucks and motor boats, giving them a better, neater and more compact appearance than anything of its kind on the market. 2, 4 and 6 cylinders. Write for detailed description.

Agents wanted.

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Agents: Auto Supply Co., 1339 Mich. Ave., Chicago, Ill.
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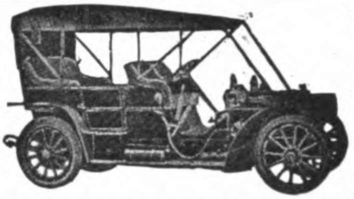

**Tops! Tops! Tops!**

**High Grade! Perfect Fit! Prompt Shipments!**

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**102-106 DWIGHT ST., SPRINGFIELD, MASS.**
Address name in full when writing.

C. O. T. Gum Gum. Ask your dealer how nicely it repairs dig-outs in your auto shoes. For sale by jobbers.

**CHARLES O. TINGLEY & CO.**
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**Overhead Vehicle Washer**

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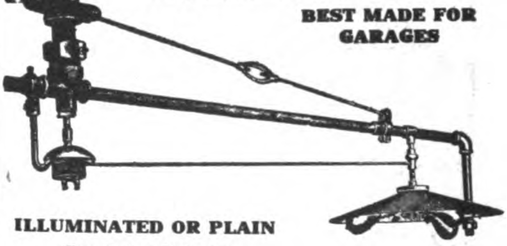

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**FAHRIG ANTI-FRICTION METAL**

FAHRIG
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The best babbitting material in the world.
All the good repairmen are using it, and the good manufacturers are starting too. It's your turn; get next. Try it.

**FAHRIG METAL CO., 316-322 Hudson St., New York**

**Every Automobile at the Show**

Will sooner or later be groomed with CLEANOLA

CLEANOLA
CLEANS, POLISHES, RENEWS and PRESERVES ALL VARNISHED SURFACES
IT IS IN DAILY USE BY ALL THE LEADING PALACE CAR, RAILROAD, TRACTION COMPANIES, BANKS, OFFICE BUILDINGS, THEATRES, ETC.
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TRADE CLEANOLA MARK REGISTERED

Nothing like Cleanola for cleaning and polishing all varnished surfaces. Removes mud stains, and rain spots. Covers varnish cracks and scratches. Leaves hard, lustrous surface. Cleanola can be used with equally good results on Leather Tops and Seats. Most perfect cleaning compound for all varnished surfaces and the only one free from alkali or acid. Renews and lengthens life of the varnish.

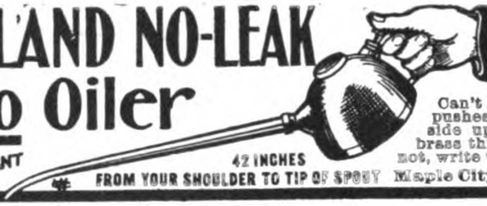
Cleans, Polishes, Renews, Preserves

Used by Principal Railroads and Palace Car Companies.
25c. can sent as sample for 10c. postage and dealer's name.

THE CLEANOLA CO., Fulton Bldg., Pittsburg, Pa.

## HOWLAND NO-LEAK Auto Oiler

SO CONVENIENT


42 INCHES
FROM YOUR SHOULDER TO TIP OF SPOUT

**A 42-INCH REACH**

Can't leak or spill. Oil drops only when thumb pushes plunger. Works at any angle or wrong side up. A big convenience. 5 sizes. Solid brass throughout. Dealers will supply you. If not, write us promptly. Catalog free.
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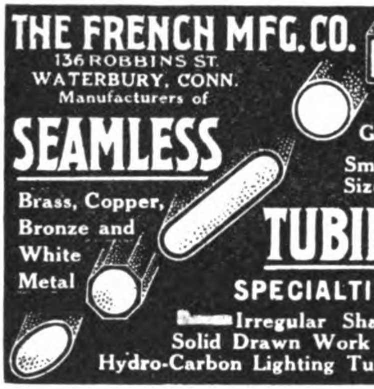
136 ROBBINS ST.
WATERBURY, CONN.
Manufacturers of



**SEAMLESS**

Brass, Copper, Bronze and White Metal

Thin Gauges
Small Sizes

**TUBING**

**SPECIALTIES:**
Irregular Shapes,
Solid Drawn Work and
Hydro-Carbon Lighting Tubing

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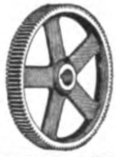
### BEVEL, SPUR, etc.



We are SPECIALISTS in manufacturing small gears. We guarantee good work at low cost; also prompt shipments.

IT WILL SAVE YOU MONEY to get our PRICES

**WOBURN GEAR WORKS**
"The Large Makers of Small Gears"
WOBURN - - - MASSACHUSETTS

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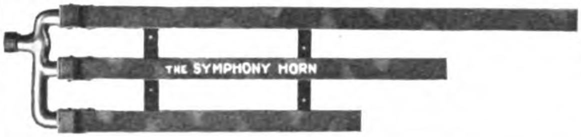

OUR LATEST IMPROVED
## Symphony Horn

**Guaranteed not to carbonize.** Does not wear out or get out of order. Write us for prices.

**Standard Engineering and Mfg. Co.**
36 Franklin St., DETROIT, MICH.

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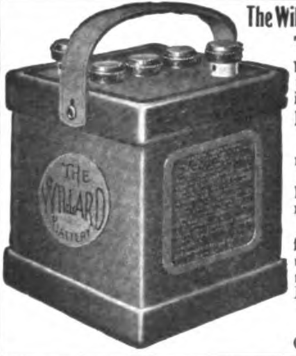

**The Willard Storage Battery**

**TERMINALS** protected by hard rubber. Corrosion is prevented.

**EXPANSION CHAMBER** receives all overflow and spray.

**PLATES**—Over ½ million in service.

**BATTERIES** for Automobile Ignition and Automobile Electric Lighting.

The Willard Storage Battery Company
Cleveland Ohio

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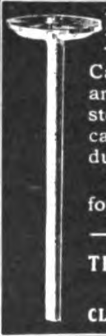
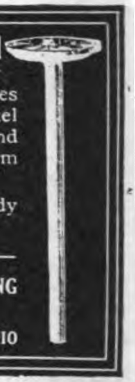


## Nickel Steel Head



Carbon steel stem valves are the best. Why? Nickel steel is best for head and carbon steel best for stem duty.

Finished complete, ready for seating, by

**THE ELECTRIC WELDING PRODUCTS CO.**
CLEVELAND OHIO

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TO CLEAN UP
SURPLUS STOCK

Semi Annual Clearing Sale
OF
Automobile Supplies & Accessories

Send for Flyer No. 18

**Neustadt Automobile and Supply Co.**
3962 Olive Street :: ST. LOUIS, MO.

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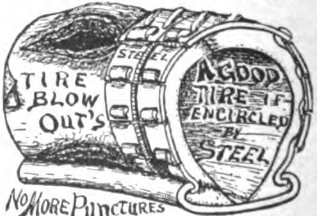
**Protect Your New Tires Repair the Old One**



Tires Will Last Forever

Steel Link Bands

Hooks to Rim

You can fix Blowout quick. If tire is completely covered by these clasps, you cannot have Blowouts, Punctures, Rim Cuts or wearing off of tire. As flexible as ever. ANTI-SKID.

KIMBALL TIRE CASE CO.
163 BROADWAY COUNCIL BLUFFS, IOWA

**HEADQUARTERS FOR**

## PRESSED STEEL AUTOMOBILE PARTS

**The Crosby Co., Buffalo, N. Y.**

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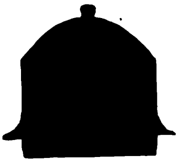

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Mercedes type—strong and durable and sold at reasonable price. Sample sections cheerfully sent upon request by mail.

**RELIABLE RADIATOR CO.**

451-453 173d E. Street, New York City

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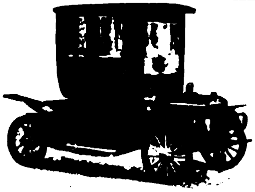

Our Specialty:

**ROBBINS Removable Coupe Top**

Designed and Built by Limousine Builders

**IRVIN, ROBBINS & CO.**
Indianapolis, Ind.

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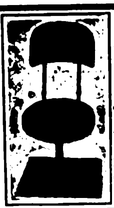
No. 10—$7.75 each

*Pat. Applied For*

**REVOLVING AUXILIARY CHAIR SEATS FOR AUTOS**

We also manufacture Bodies, Tops and Wind Shields at **Rock Bottom Prices**

**THE HILL MFG. CO.**
27 Fuller St., Buffalo, N. Y
See us at the New York Show, Grand Central Palace.



No. 12—$8.75 each

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## Detroit Carriage Company

**DETROIT, MICHIGAN**

**Expert** Designers and Builders of **Automobile Bodies**, in the White, Painted and Trimmed. Capacity 20,000 Bodies Annually.

**Roger B. McMullen, General Sales Agent**
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Price $1.50

A plug instantly separable for cleaning purposes, priming the engine, or replacing the core.
Practically soot-proof, constructed to make it positively leak-proof.
Mechanically perfect, and made of high-grade material.
For further information, apply to

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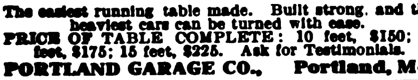

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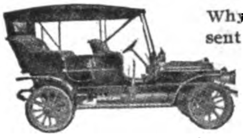

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The most successfully cooled cylinders of any motor in existence
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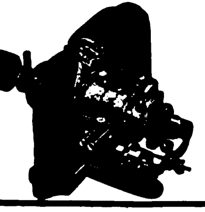
The Frayer-Miller Co., Motor Mart, New York



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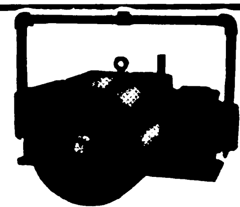

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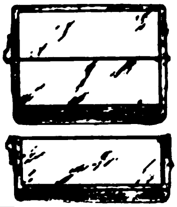

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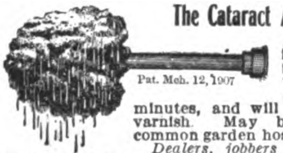

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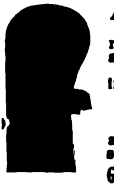

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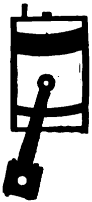

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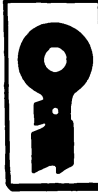

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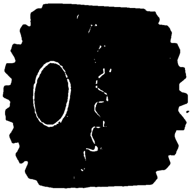

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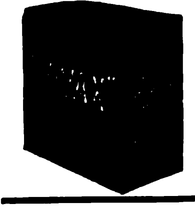

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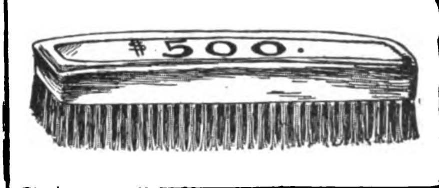

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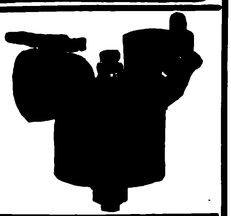

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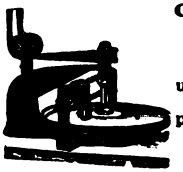

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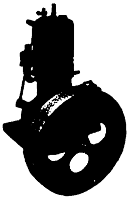

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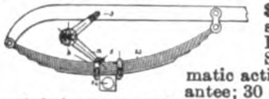

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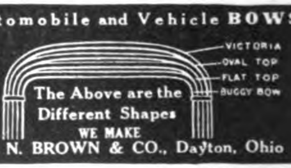
Automobile and Vehicle **BOWS**



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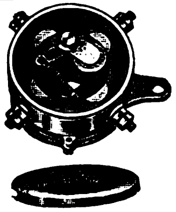

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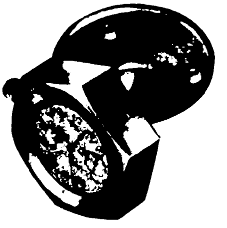

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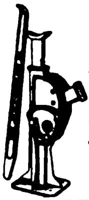

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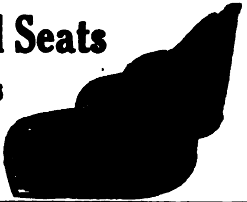

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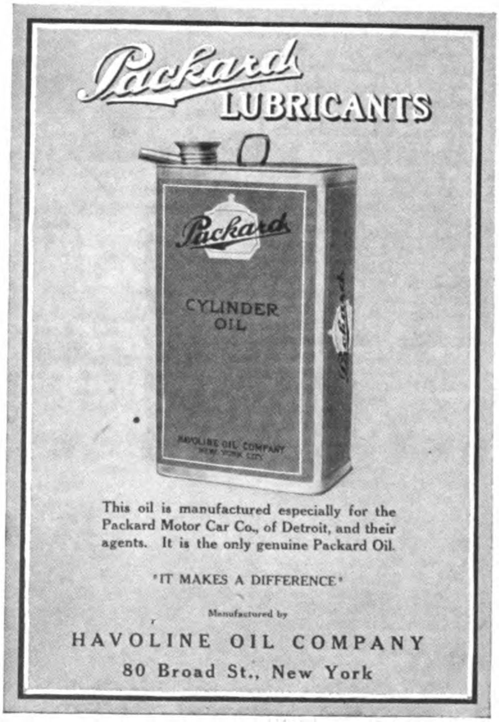

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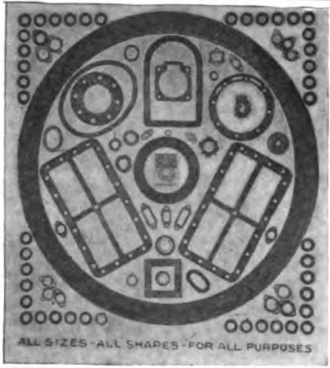

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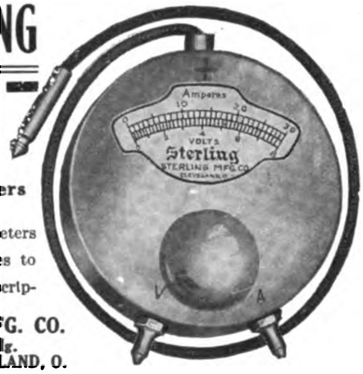

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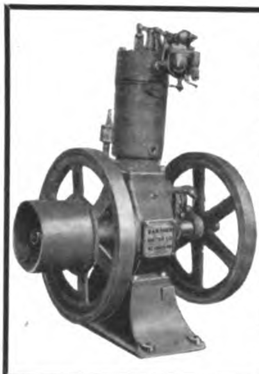

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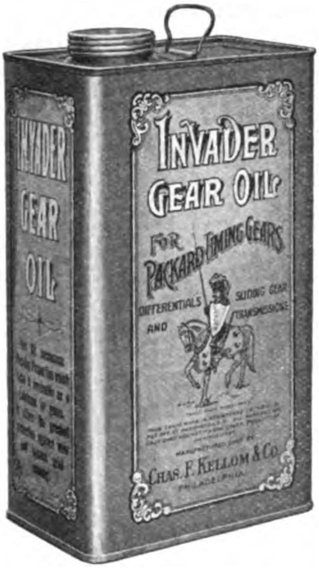
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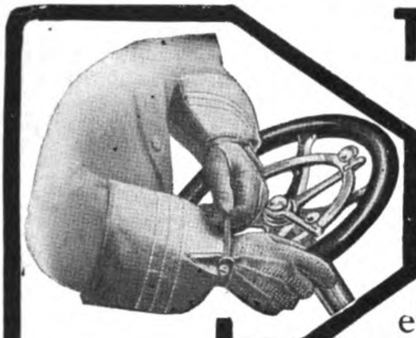

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is the most convenient feature ever added to Motoring Gloves. It holds the gloves snug and comfortable at the wrist, keeps the gauntlet in place, prevents slipping and excludes all dust, snow, etc.

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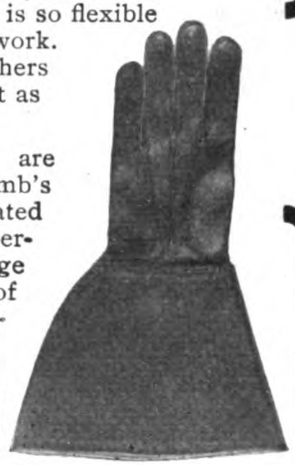

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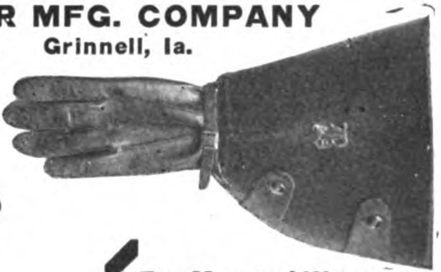

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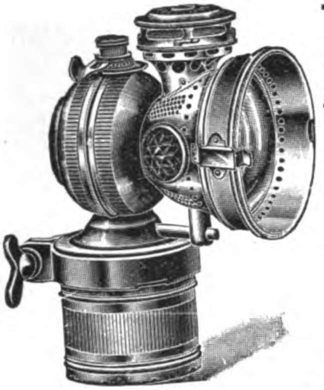

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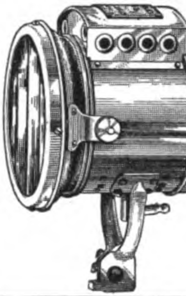

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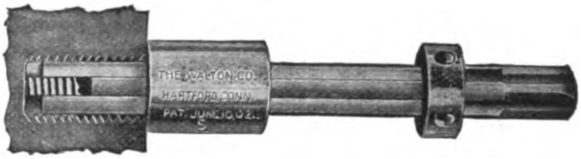
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HARTFORD, CONN.
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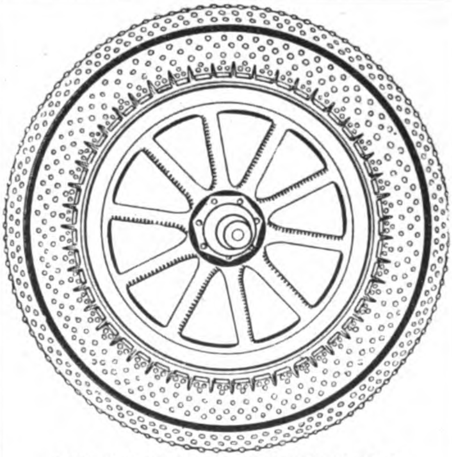

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Midlothian, Texas

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Meyer, Henry E.... 410
Meyercord Co., Inc.... 422
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Mound Tool & Scraper Co.... 399
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New Process Steel Co.... 390
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Robbins, Irvin & Co.... 415
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Standard Eng. & Mfg. Co.... 414
Standard Gauge Mfg. Co.... 413
Standard Metal Mfg. Co.... 339
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Standard Welding Co.... 349
Stanley Cabinet Mfg. Co.... 393
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Stitch-Nine Vul. Co.... 411
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Stromberg Motor Devices Co.... 424
Studebaker Auto Co.... 425
Supplementary Spiral Spring Co. 345
Sussfeld, Lorsch & Co.... 365
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Syracuse Alum. & Bronze Co.... 396
Syracuse Gear Co.... 389
85 Per cent. Auto Sup. Co.... 406
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Thomson, Judson L. Co.... 409
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Ward, L. C. Machine Co.... 377
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Wray Pump & Register Co.... 341
Wright Cooler & Hood Co.... 401
Yankee Co.... 394
York Motor Car Co.... 91
Youse, E. S.... 358
Zimmerman Mfg. Co.... 408
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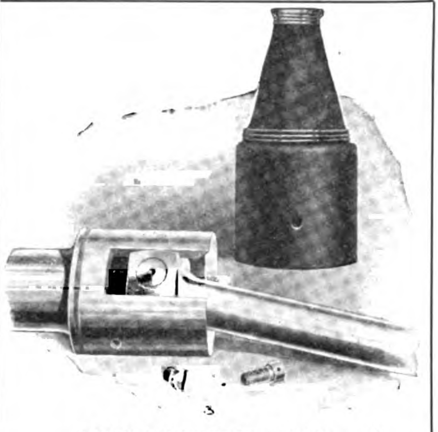
# "HARTFORD" UNIVERSAL JOINTS



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have proven their worth by the only real method that counts—***Every Day Use***—on various makes and sizes of cars. Proof of this fact—last year's customers are doubling up on their orders for 1909. Satisfaction is what counts.

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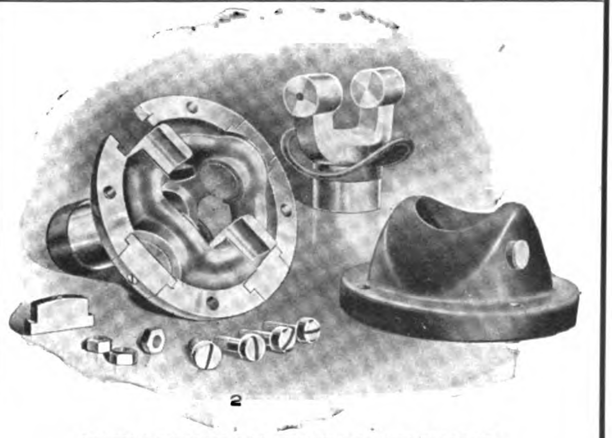
*It's a pleasure*
*to quote prices*



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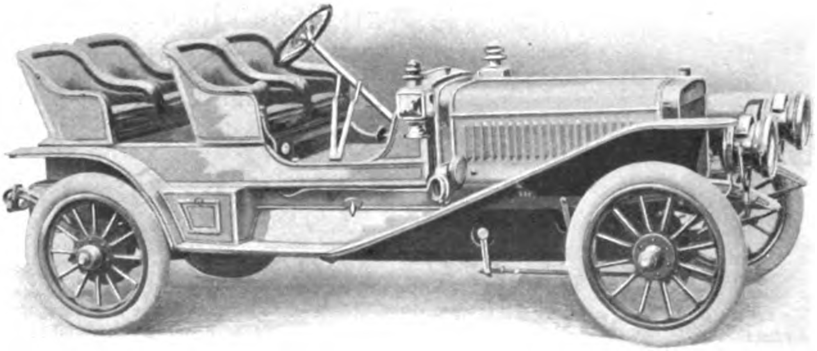
The more critically you test the



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